Report 11360 December 1998

Integrated Advanced Microwave Sounding Unit-A (AMSU-A)
Performance Verification Report
METSAT Phase Locked Oscillator Assembly,
P/N 1348360-1, S/N's F07 and F08

Contract No. NAS 5-32314 CDRL 208

Submitted to:

National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt, Maryland 20771

Submitted by:

Aerojet 1100 West Hollyvale Street Azusa, California 91702

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AMSU-A VERIFICATION TEST REPORT METSAT PHASE LOCKED OSCILLATOR ASSEMBLY

TEST ITEM: AMSU-A PHASE LOCKED OSCILLATOR ASSEMBLY P/N 1348360-1 SERIAL NUMBERS F07, F08

PREPARED FOR

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION GODDARD SPACE FLIGHT CENTER GREENBELT, MARYLAND 20771

PREPARED BY

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1.0 SUMMARY

Two Flight Model AMSU-A Phase Locked Oscillators (P/N 1348360-1, S/N F07 and F08) have been tested per AES Test Procedure AE-26758 Rev. B, which include full functional testing, vibration testing, thermal testing, and AM/FM Noise testing. Both assemblies satisfactorily passed all performance requirements of the AE-26633 Product Specification.

During the thermal cycling of both units, spurs developed 1 MHz from the carrier when the units were cold, and TARs were written to document the anomaly. The symptoms observed in both cases were consistent with inadequate tuning. The units were successfully re-tuned. In the case of F08, re-tuning required a design change which allowed a greater range of possible values for tuning resisters. Both units completed thermal cycling without further delay.

2.0 REQUIREMENTS

The acceptance test procedure AE-26758B consists of tests designed to show compliance of the Phase Locked Oscillator with all requirements stated in the PLO Product Specification AE-26633. The tests reported herein demonstrate the acceptability of the AMSU-A PLO assemblies S/N's F07 and F08, and therefore compatibility with the AMSU-A Receiver Assembly.

3.0 RESULTS

The results of the required tests are presented in the following section as test data. As indicated on the test data sheets, all measured data passed all requirements.

4.0 TEST DATA

A summary of the test data is provided at the start of each of the following sections, and raw data, reproduced as recorded, accompanies. The following table provides a concise summary of each unit's performance ability.

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The remainder of this report contains the raw data taken during the tests of the two flight PLOs. The data is arranged by the following segmentation:

Section 1A: Initial Functional Testing - F07

1B: Initial Functional Testing - F08

Section 2A: Acceptance Level Vibration - F07

2B: Acceptance Level Vibration - F08

Section 3A: Frequency and Power Hysteresis - F07

3B: Frequency and Power Hysteresis - F08

Section 4A: EMI/RE02 Testing - F07 (not required)

4B: EMI/RE02 Testing - F08 (not required)

Section 5A: Final Functional Testing - F07

5B: Final Functional Testing - F08

Section 6A: AM/FM Noise Levels - F07

6B: AM/FM Noise Levels - F08

Section 7: PLO As-Built F07 and F08

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Section 1A: Initial Functional Testing - F07

This section contains the results of a full functional test over temperature taken before PLO F07 endured thermal cycling. All tests passed.

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Summary of Test Results for AMSU-A Phase Locked Oscillator Testing Serial Numbers F07 and F08

Paragraph	Description	Requirements	F07	F08
3.2.1.1	Input Voltage and	600 mA max, +15V	499 mA for	542 mA for
5.2.1.1	Current	100 mA max, -15V	+15V, 67 mA	+15V, 66 mA
	Caron	,	for -15V	for -15V
3.2.1.2	Operating Temperature	+1°C to 44°C	-23°C to	-1°C to 60°C
3.2.1.2	Operating 10mp		+60°C	
3.2.1.3	Start-up	All loads, +60°C and -	Verified at	Verified at
3.2.1.0	Ţ.	30°C; in vacuum	+60 and -	+60 and -
			30°C, ambient	30°C, ambient
3.2.1.4 &	Frequency Stability from	±200 kHz	-26 kHz, -17	-25 kHz to -29
3.2.1.5	57.290344 GHz		kHz	kHz .
5.2.1.5				
3.2.1.6	RF Output Power	17 to 20 dBm	19.2 dBm	18.7 dBm
	0.133	.1.5.JD	0.7 dB	1.2 dB
3.2.1.7	Output Power Stability	<1.5 dB	0.7 0.5	1.2 db
3.2.1.8	Load VSWR	2.01:1 or less	Verified	Verified
3.2.1.0	2000			
3.2.1.9	AM Noise	<-130 dBc/Hz @ 1 MHz	-140 dBc/Hz	-140 dBc/Hz
J. 211.7			@ 1MHz	@ 1Mhz
3.2.1.10	FM Noise	<-100 dBc/Hz @ 1 MHz	-103 dBc/Hz	<-100 dBc/Hz
2.2.2			@ 1 MHz	@ 1 MHz
3.2.1.11	Spurious and Sub-	<-90 dBc	< -92 dBc	<-92 dBc
	Harmonic Signals			
3.2.1.12	Harmonics	<30 dBc	-69 dBc	-69 dBc
			77 10 1	Verified
3.2.1.14	Warm-up Time	< 30 minutes	Verified	venned
			P. Dosign	By Design
3.2.1.15	Grounding and		By Design	By Design
	Shielding			
	T. A. Walter a Drestation		By Design	By Design
3.2.1.16	Input Voltage Protection		Dy Design	2,200
3.2.1.17	Reverse Polarity		By Design	By Design
3.2.1.17	Protection			
	rotection			
Environmental				
Testing				
Microphonics		AE-26633	TCXO Test	TCXO Test
Radiation	 	AE-26633	By Analysis	By Analysis
Hardness				
EMI/RFI		AE-26633	Not Required	Not Required
Vibration		AE-26633	Acceptance	Acceptance
, ibiation			Level	Level
Thermal		AE-26633	Verified at	Verified at
Vacuum			Ambient	Ambient
Leadin			Pressure Only	Pressure Only
Weight		2.0 lbs	2.0 lbs	2.0 lbs

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TEST DATA SHEET 6A (Sheet 2 of 4) Functional Testing (Paragraph 4.2.1)

Pre-Environmental CPT Paragraph 4.2.1.3 (Cont): Measured Pass/Fail Test Expected Step Frequency vs. Voltage 14 +Voltage = f(4,90) V $+14.8 \pm 0.05 \text{ V}$ ± 15 V Supplies -Voltage = -14.79 V $-14.8 \pm 0.05 \text{ V}$ Pars Freq. = 57 290 3089 GHz 57.290344 ± .0002 GHz 252 Pass P = 19.3 dBm 17 to 20 dBm -200 to -90 dBc Plots. Spurious and Sub 15 Pass <-10 dBm dBm Pass Power level of 114.58 GHz 16 Load VSWR and Frequency Pulling 17 N/A Worst Case Freq = N/A 2:1 mismatch over 1λ 25 Hz Worst Case Power = N/A N/A 2:1 mismatch over 1λ dB Peak TC1 =0.5°L Pass $TC1 = 1 \pm 2^{\circ}C$ Operating Temperature 18 N/A TC2 =1,506 @ 1°C baseplate N/A TC3 =0.600 Pass DROL/A = 43 mV0 - 1VPLO L/A = 46 WV 0 - 1V Input Voltage and Current 19 VM1 = +ISOLuce $+15 \pm 0.1 \text{ V}$ VM1 Voltage Pass VM2 = -(CO)V $-15 \pm 0.1 \text{ V}$ VM2 Voltage IM1 = 0.89600 mA max. IM1 Current عكة 100 mA max. IM2 = 66IM2 Current DRO L/A = 43 m V 0 to 1V DRO L/A Voltage PLO L/A = 46 AV 0 to 1V PLO L/A Voltage Page 17 to 20 dBm Power = 19.97 dBm RF Output Power Freq. \$2.290 3/25 **GHz** 57.290344 ± .0002 GHz Frequency Frequency vs. Voltage Pass +Voltage = +15.21 V $+15.2 \pm 0.05 \text{ V}$ ± 15 V Supplies $-Voltage = -1 \Sigma 20 V$ $-15.2 \pm 0.05 \text{ V}$ Freq. = 5). 290 3/24 GHz Pass 57.290344 ± .0002 GHz Pass Power = 20 dBm 17 to 20 dBm Frequency vs. Voltage +Voltage = 14.80 V $+14.8 \pm 0.05 \text{ V}$ ± 15 V Supplies -Voltage = -(4.77)V255 $-14.8 \pm 0.05 \text{ V}$ Freq. = 57, 2903/2 7 GHz 57.290344 ± .0002 GHz Pass Power = 20 dBm 17 to 20 dBm Jass

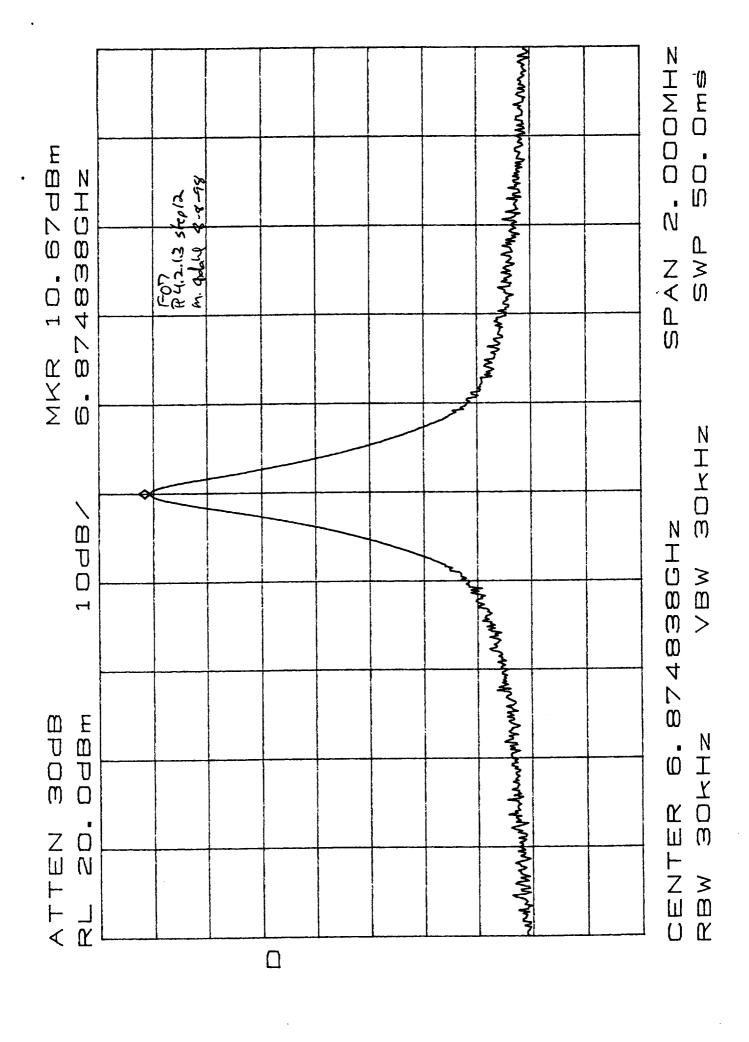
TEST DATA SHEET 6A (Sheet 3 of 4) Functional Testing (Paragraph 4.2.1)

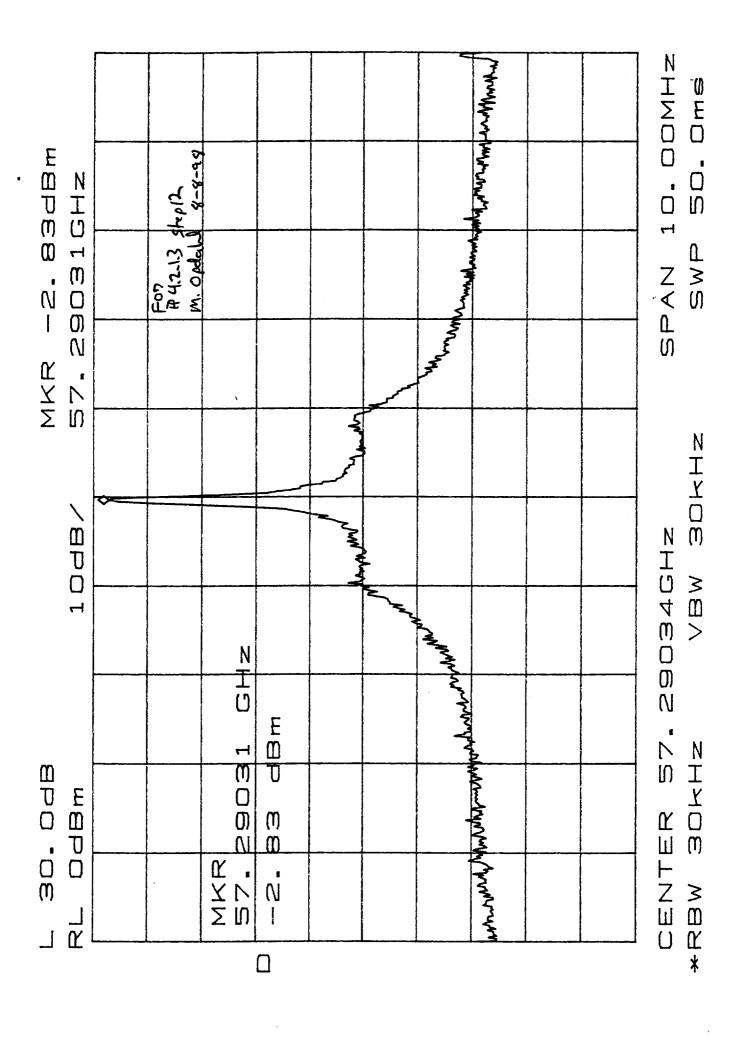
Paragra	aph 4.2.1.3 (Cont):	Pre-Environmental CP	•	
Step	Test	Expected	Measured	Pass/Fai
19	Spurious and Sub	-200 to -90 dBc	See Plats	Pass
(Cont)	Power level of 114.58 GHz signal	<-10 dBm	dBm	Pass
,	Load VSWR and Frequency P	ulling		
	2:1 mismatch over 1λ	N/A	Worst Case Freq = ≈ 5 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = dB Peak	N/A
21	Operating Temperature	TC1 = 44 ±2°C	TC1 = 43.9°L	Pass
!	@ +44°C Baseplate		TC2 = 45.7°C	N/A
!	_	ĺ	TC3 = 44,1°C	N/A
ļ		0 - 1V	DRO L/A = //6 mV	Pass
		0 - 1V	PLO L/A = 1001 mV	Pass
22	Input Voltage and Current			
1	VM1 Voltage	+15 ± 0.1 V	VM1 = <u> </u>	Pass
	VM2 Voltage	-15 ± 0.1 V	$VM2 = \underline{-15.0} V$	Pias
	IM1 Current	600 mA max.	IM1 = mA	Pars
ļ	IM2 Current	100 mA max.	IM2 = <u>6 §</u> mA	Pers
1	DRO L/A Voltage	0 to 1V	DRO L/A =//6 W	Pess
1	PLO L/A Voltage	0 to 1V	PLO L/A = 104 mV	Hoss
1	RF Output Power and	17 to 20 dBm	Power = <u>/8.9</u> dBm	Pass
1	Frequency	57.290344 ± .0002 GHz	Freq. = <u>\$7.2902974</u> GHz	Pass
	Frequency vs. Voltage			,
-	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = <u>+15.20</u> V	Pass
1		-15.2 ± 0.05 V	-Voltage =V	(35)
		57.290344 ± .0002 GHz	Freq. = 57.2902969 GHz	Pass
	L	17 to 20 dBm	Power = <u>18.9</u> dBm	First
	Frequency vs. Voltage			
1	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = fix.yo V	Pacs
		-14.8 ± 0.05 V	-Voltage = <u>~(4.90</u> V	Pacs
1		57.290344 ± .0002 GHz	Freq. = 57 2902769 GHz	Per
1		17 to 20 dBm	Power = 18.9 dBm	Pess

Paragra	ph 4.2.1.3 (Cont):	Pre-Environmental C		
Step	Test	Expected	Measured	Pass/Fail
22	Spurious and Sub	-200 to -90 dBc	See Plots	Acos
(Cont)	Power level of 114.58 GHz signal	<-10 dBm	-63 dBm	Page
	Load VSWR and Frequency Pull	ing		
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 2 Hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = O. 95 dB Peck	N/A
				,
				,
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Shop Order No.:	534921	Test Engineer:	<i>)</i> 工
Operation:	0110	Quality Control	_
Unit Serial No.: _	FOT	Govt. Rep.: (1998) 515/96	

Date: 8-8-94





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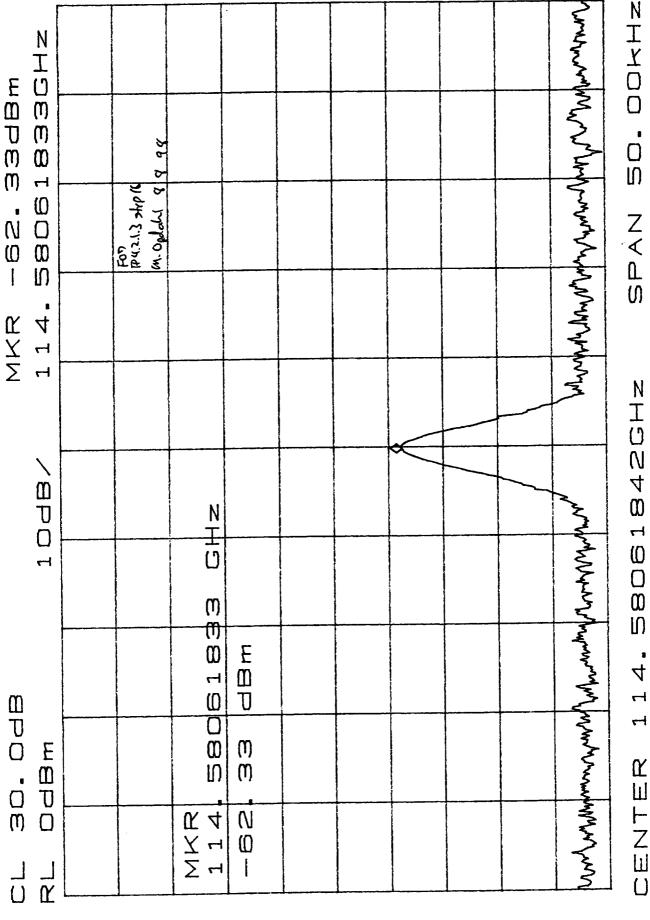
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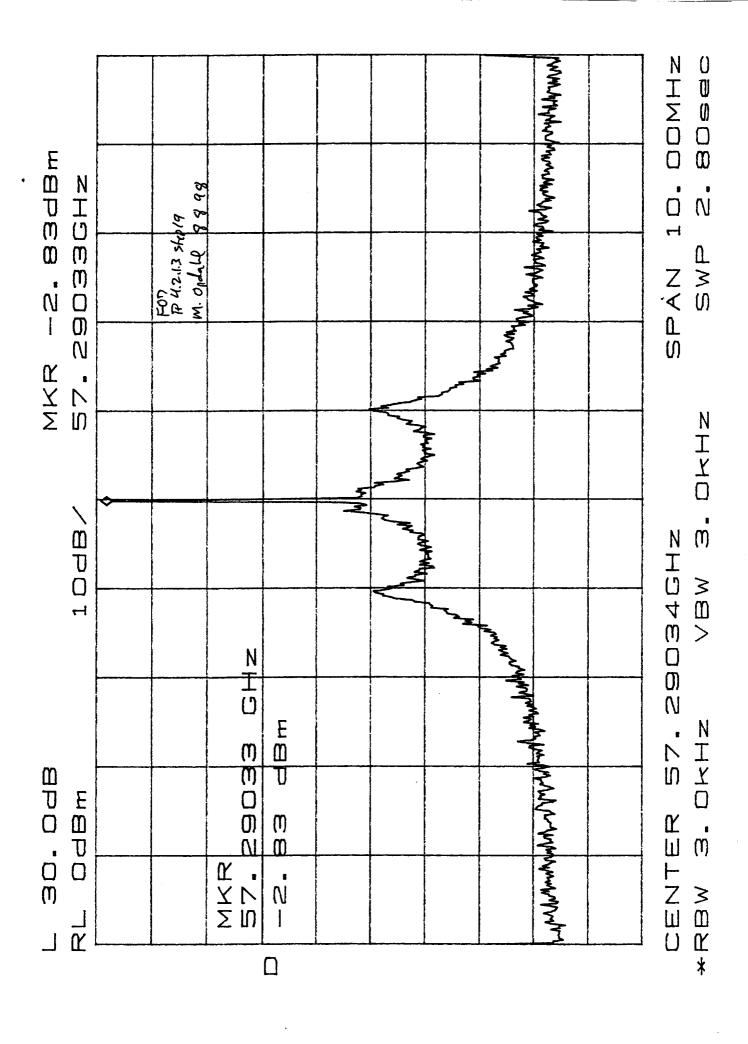
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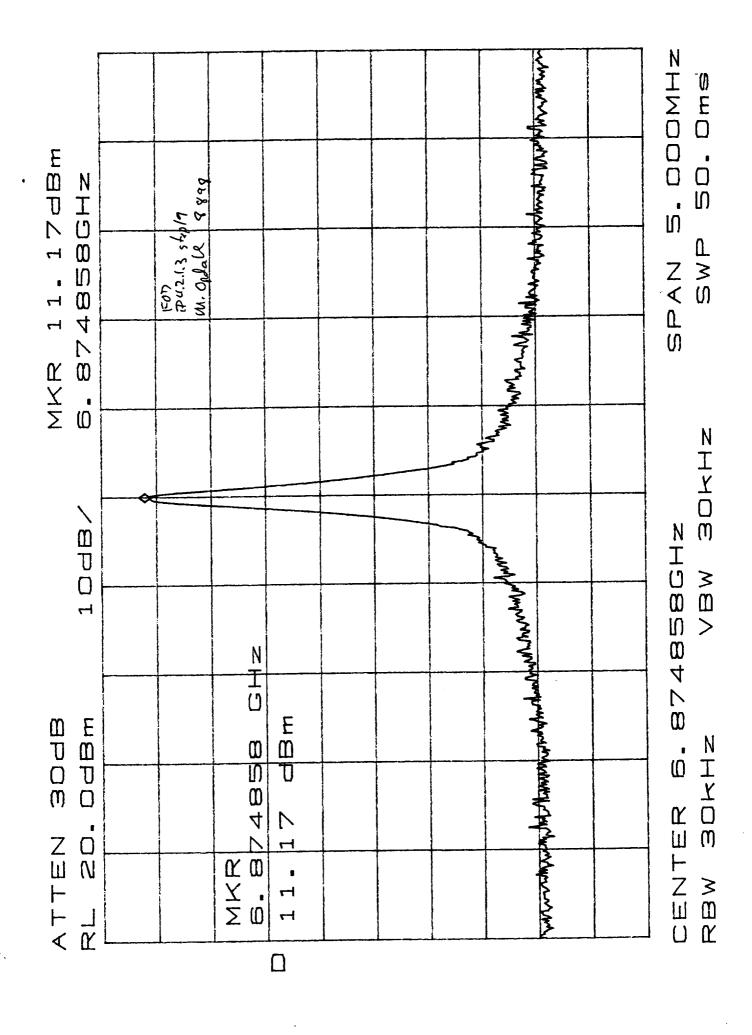
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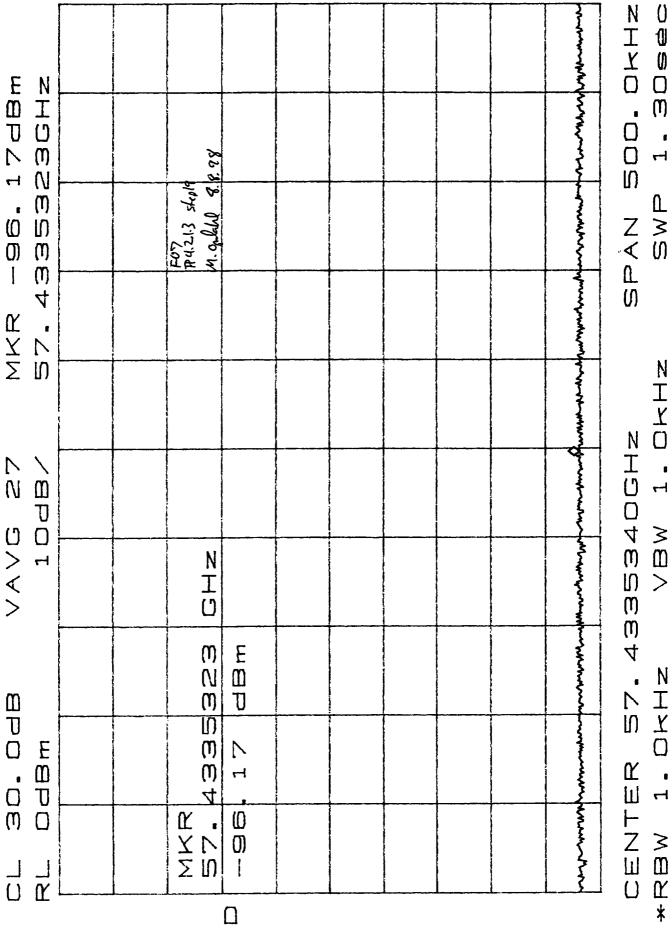


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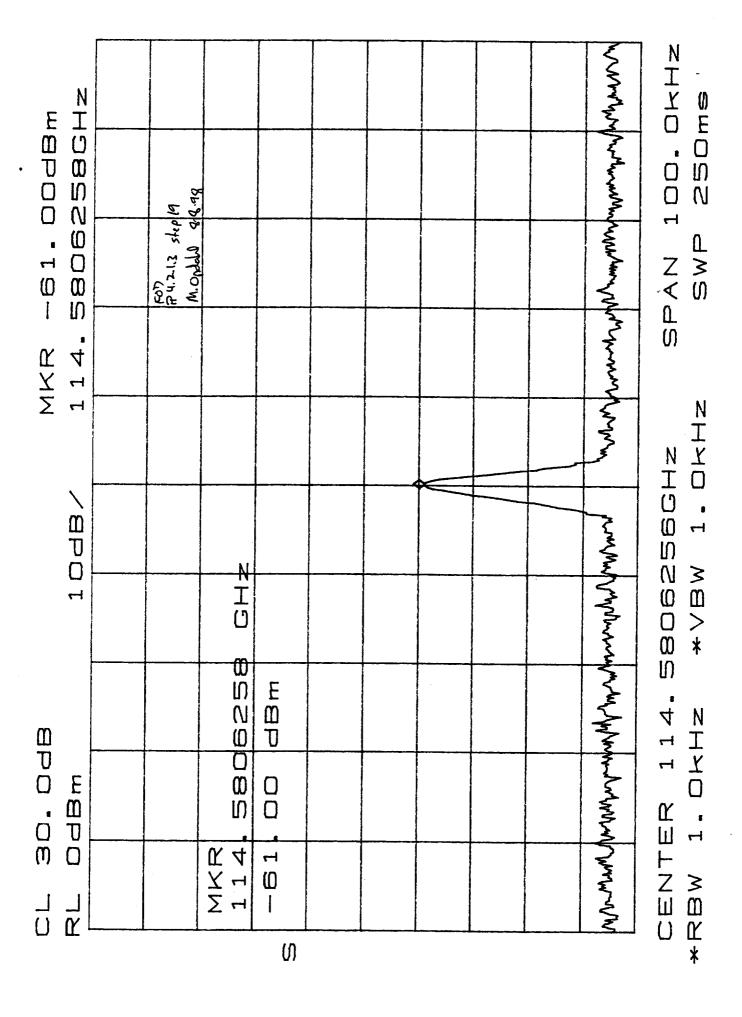
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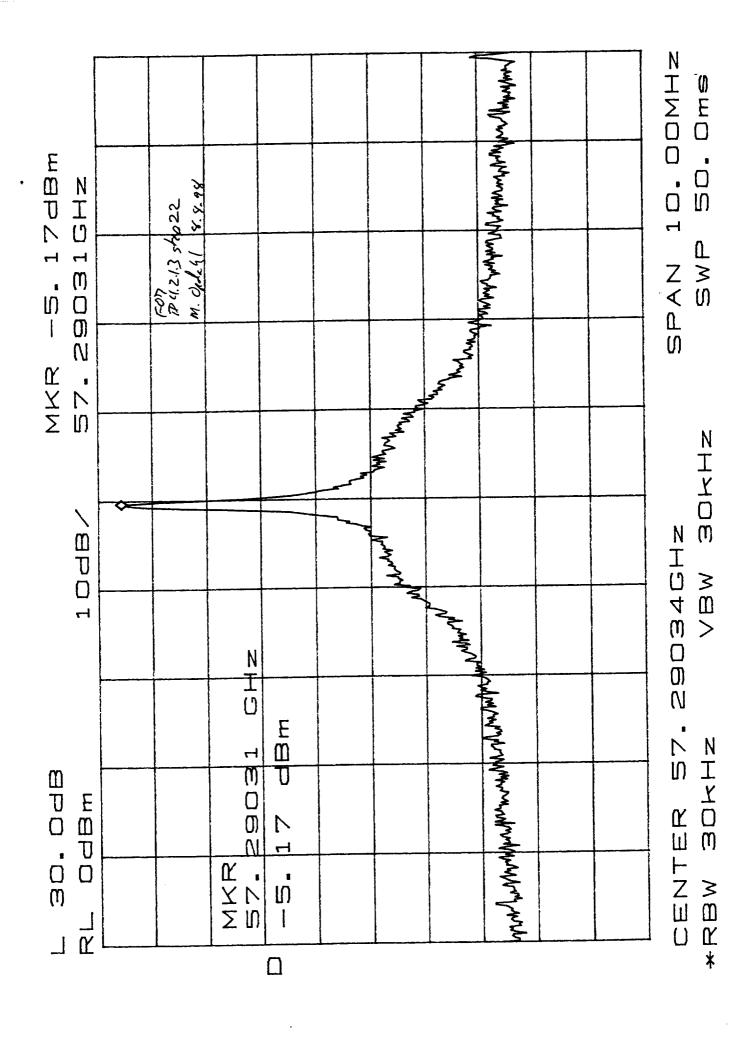
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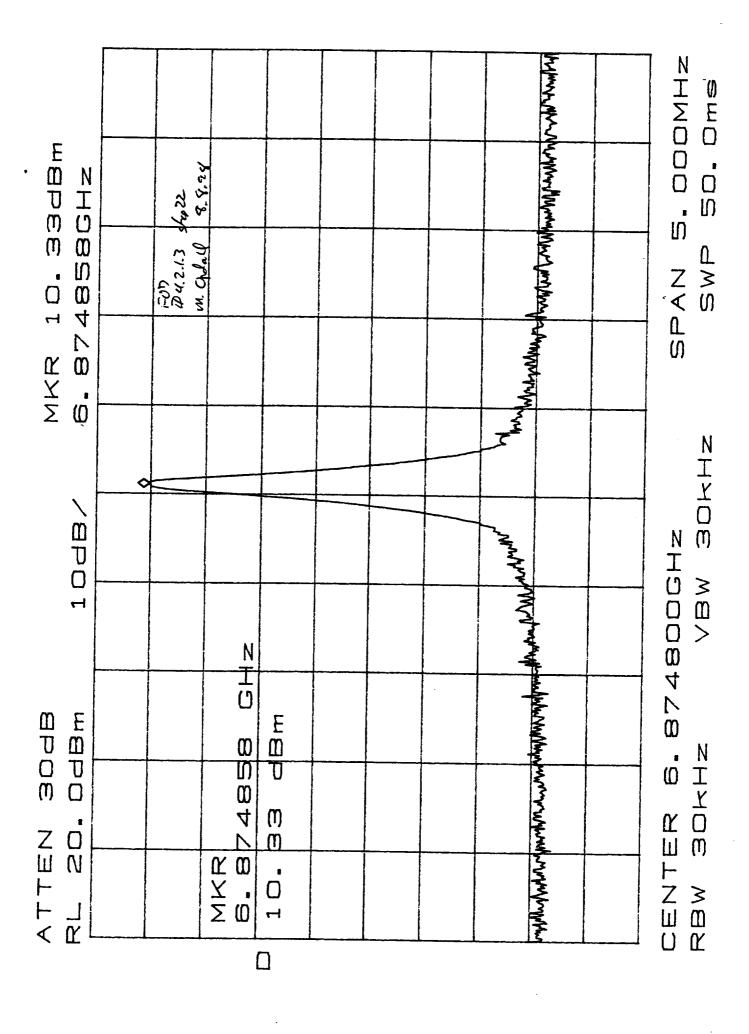


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-97. 17dBm 5767463GHz		F-U7 P-4.21.3 stop 22 U4. On D. L. Q. 9.9.8						de la	SPAN 500. OKHZ SWP 1. 30sec
AVG 7 MKR 10dB/ S7.		N						esperately for the house of the second property and the modely maked	7480GHN VBW 1.OKHN
30.0dB VA		MKR 57. 6767463 GHz	-97.17 dBm					of free of the second polyplant of the second of the secon	CENTER 57.5767480GHK *RBW 1.0KHK VBW 1.0
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MKR -06. 33dBm 57. 7199723GHz		F4.2.1.3 5/422				and the state of t	SPAN 500. OKHX 4x SWP 1. 30sec
VAVG 10 10dB/		N I U				on the second	00740GIN
CL 30.0dB RL 0dBm		MKR 57. 7199723	D -96.33 dBm			The many services and services are services and services and services and services and services are services and services and services and services are services are services and services are services	*RBW 1. OKHN

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Section 1B: Initial Functional Testing - F08

This section contains the results of a full functional test over temperature taken before PLO F08 endured thermal cycling. All tests passed.

TEST DATA SHEET 6A (Sheet 1 of 4)

Functional Testing (Paragraph 4.2.1) Pre-Environmental CPT

Test Setup Verified:

Step	ph 4.2.1.3, Functional Testing: Test	Expected	Measured	Pass/Fail
1	Potential Difference from ± 15	V RTN to:		
	PLO Base Plate	< 1.0 Vac	0.1	Pres
	Spectrum Analyzer	< 1.0 Vac	0.1	Rus
	Frequency Counter Chassis	< 1.0 Vac	0.1	aug
	Power Meter Chassis	< 1.0 Vac	0./	Auss
4	Evacuate vacuum chamber and record pressure	<10 ⁻² toπ	N/A	N/A*
5	Thermal couple readings	$TC1 = 22 \pm 2 ^{\circ}C$	TC1 = 22.9 °C	Duss
			TC2 = 23.0 °C	N/A
			TC3 = 226 °C	N/A
6	DRO L/A	0 to 1V	DRO L/A = 6/ MV	Pas
	PLO L/A	0 to 1V	PLO L/A = 60.9 V	Du=5
	Is PLO locked?	Yes	Yes X	
			No	Pass
7	PLO Frequency	57.290344 ± .0002 GHz	Freq. = 57.203190 GHz	Pass
	PLO Power	17 to 20 dBm	$P = \frac{\sqrt{g}}{\sqrt{g}} dBm$	
8	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = <u>(C6</u> V	Dass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -5.0 V	Pug
	IM1 Current	600 mA max.	IM1 = 542 mA	Puss
	IM2 Current	100 mA max.	IM2 = 65.6 mA	Pars
	DRO L/A Voltage	0 to 1V	DRO L/A = 6/ m/V	Pass
	PLO L/A Voltage	0 to 1V	PLO L/A = _ 6/ NV	Pass
12	RF Output Power and	17 to 20 dBm	P = <u>/%.7</u> dBm	Dag
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.2903192 GHz	Driss
	Baseplate Temp. (TC1)	$TC1 = 22 \pm 2^{\circ}C$	TC1 = 55.8 ℃	Poss
13	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	$+$ Voltage = $\sqrt{5}$ $\frac{2}{}$ V	Pros
		-15.2 ± 0.05 V	-Voltage =V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.2903192 GHz	Poss
		17 to 20 dBm	P = /8.7 dBm	Pers

^{*}Record data only if performing test under vacuum

· 			

TEST DATA SHEET 6A (Sheet 2 of 4) Functional Testing (Paragraph 4.2.1)

	ph 4.2.1.3 (Cont):			
Step	Test	Expected	Measured	Pass/Fa
14	Frequency vs. Voltage			<u> </u>
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 19.80 V	Dass
		-14.8 ± 0.05 V	-Voltage = <u>-/4.80</u> V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.2703 m2 GHz	Bros
		17 to 20 dBm	P = <u>/ ½ > dB</u> m	Pas S
15	Spurious and Sub	-200 to -90 dBc	See Plots	Park
16	Power level of 114.58 GHz signal	<-10 dBm	dBm	Pass
17	Load VSWR and Frequency Pr	ulling		
	2:1 mismatch over 1λ	N/A	Worst Case Freq =	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power =dB Peak	N/A
18	Operating Temperature	TC1 = 1 ±2°C	TC1 = 1.6	Peas
	@ 1°C baseplate:		TC2 = 1.6	N/A
•			TC3 = 1.3	N/A
		0 - 1V	DRO L/A = <u>46 m</u> V	Does
		0 - 1V	PLO L/A = 46 wV	Dass
19	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = <u>/S.O_</u> V	Pass
•	VM2 Voltage	-15 ± 0.1 V	VM2 =/5 O V	Page
	IM1 Current	600 mA max.	IM1 = _526 mA	
	IM2 Current	100 mA max.	IM2 =64 mA	Pry; Auss
	DRO L/A Voltage	0 to 1V	DRO L/A = 46 anV	Auss
	PLO L/A Voltage	0 to 1V	PLO L/A = 460N	Piess
·	RF Output Power	17 to 20 dBm	Power =	Pass
	Frequency	57.290344 ± .0002 GHz	Freq. = <u><22.2903690</u> GHz	Acres
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.20 V	Plass
		-15.2 ± 0.05 V	$-Voltage = \underline{-i5.20}V$	Press
		57.290344 ± .0002 GHz	Freq. = (7), 290309/ GHz	Dog
		17 to 20 dBm	Power = /9.4 dBm	Pirs
	Frequency vs. Voltage			<u> </u>
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14-80 V	Pass
		-14.8 ± 0.05 V	-Voltage =14.90 V	Pass
		57.290344 ± .0002 GHz	Freq. = 57. 210309/ GHz	Pass
	1	17 to 20 dBm	Power = _/7. \(\frac{1}{2} \) dBm	Pass

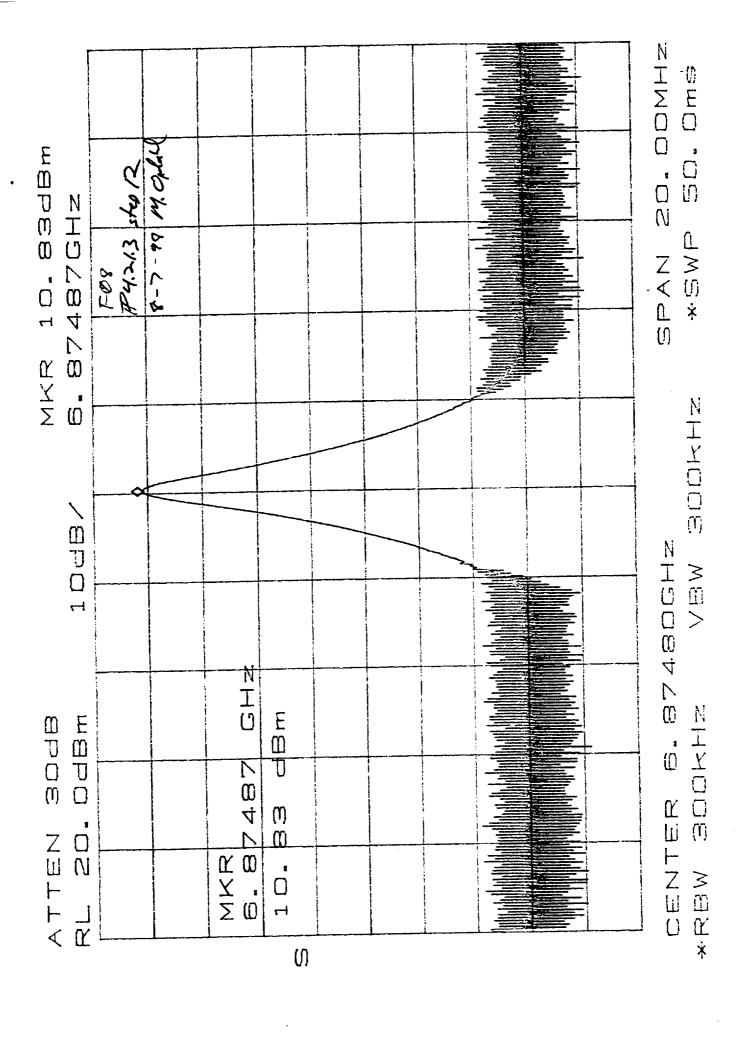
TEST DATA SHEET 6A (Sheet 3 of 4) Functional Testing (Paragraph 4.2.1)

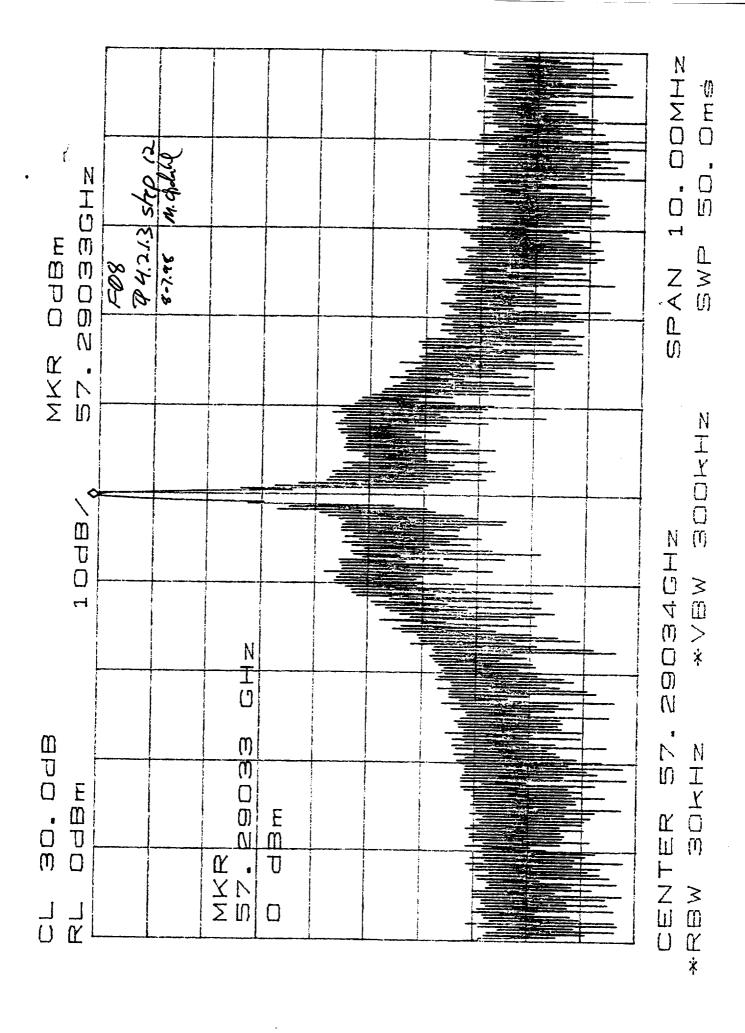
Darann	ph 4.2.1.3 (Cont):	Pre-Environmental CP	T	
Step	Test	Expected	Measured	Pass/Fai
19	Spurious and Sub	-200 to -90 dBc	Su Plots	Dass
(Cont)	Power level of 114.58 GHz signal	<-10 dBm	dBm	Pass
	Load VSWR and Frequency P	ulling		
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 5 H2	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power =dB Reak	N/A
21	Operating Temperature	TC1 = 44 ±2°C	TC1 = 45.1	Des
	@ +44°C Baseplate		TC2 = 45.1	N/A
			TC3 = 44.7	N/A
		0 - 1V	DRO L/A = 111 mV	Res
		0 - 1V	PLO L/A = (10 mV	Aus
22	Input Voltage and Current	,		
	VM1 Voltage	+15 ± 0.1 V	VM1 = <u>(5:0</u> V	Pag
	VM2 Voltage	-15 ± 0.1 V	VM2 = V	Rag
	IM1 Current	600 mA max.	IM1 =\$3^*) mA	Pag
	IM2 Current	100 mA max.	IM2 = 67 mA	Rug
•	DRO L/A Voltage	0 to 1V	DRO L/A =V	Pars
	PLO L/A Voltage	0 to 1V	PLO L/A =V	Pars
	RF Output Power and	17 to 20 dBm	Power = <u>18.2</u> dBm	Ass
	Frequency	57.290344 ± .0002 GHz	Freq. = 57, 290 3/59 GHz	Poiss
	Frequency vs. Voltage			
•	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = <u>15.20</u> V	Abes:
		-15.2 ± 0.05 V	-Voltage = <u>75.20</u> V	Pass
	•.	57.290344 ± .0002 GHz	Freq. = 5>. 2403157 GHz	Pess
	,*	17 to 20 dBm	Power = /8. \(\) dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>+/4.8/</u> V	Pass
	,	-14.8 ± 0.05 V	-Voltage = <u>-u. 10</u> V	Pass
•		57.290344 ± .0002 GHz	Freq. = 5). 270 35 9 GHz	Pass
	7.	17 to 20 dBm	Power = 18-2 dBm	Pus

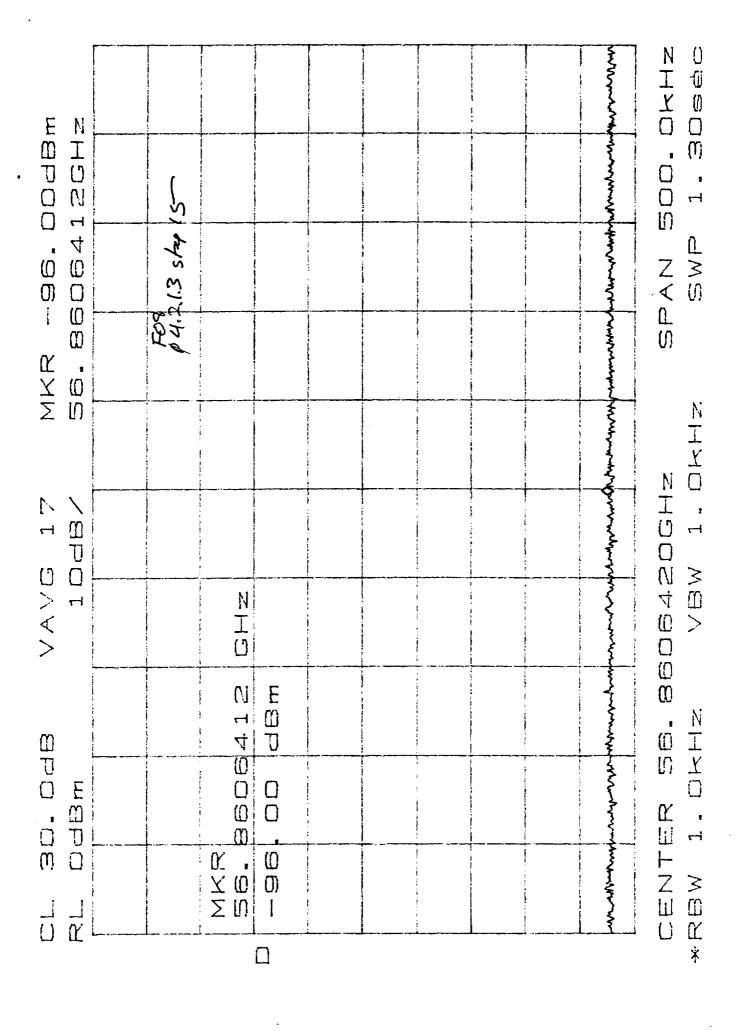
TEST DATA SHEET 6A (Sheet 4 of 4)

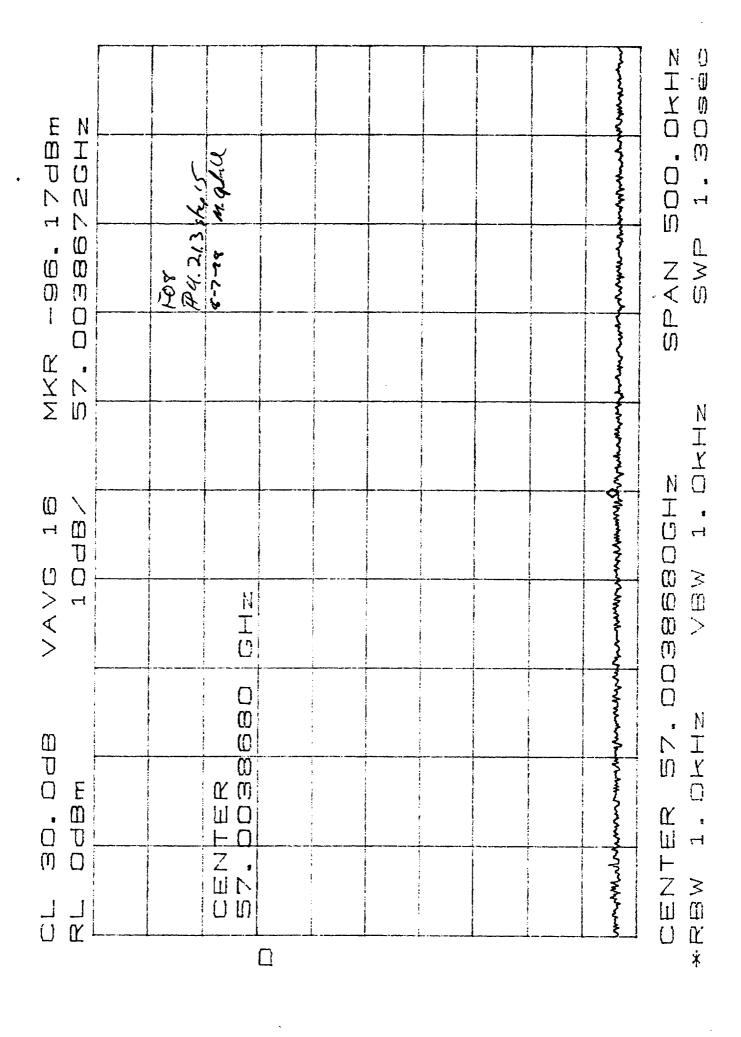
Functional Testing (Paragraph 4.2.1)

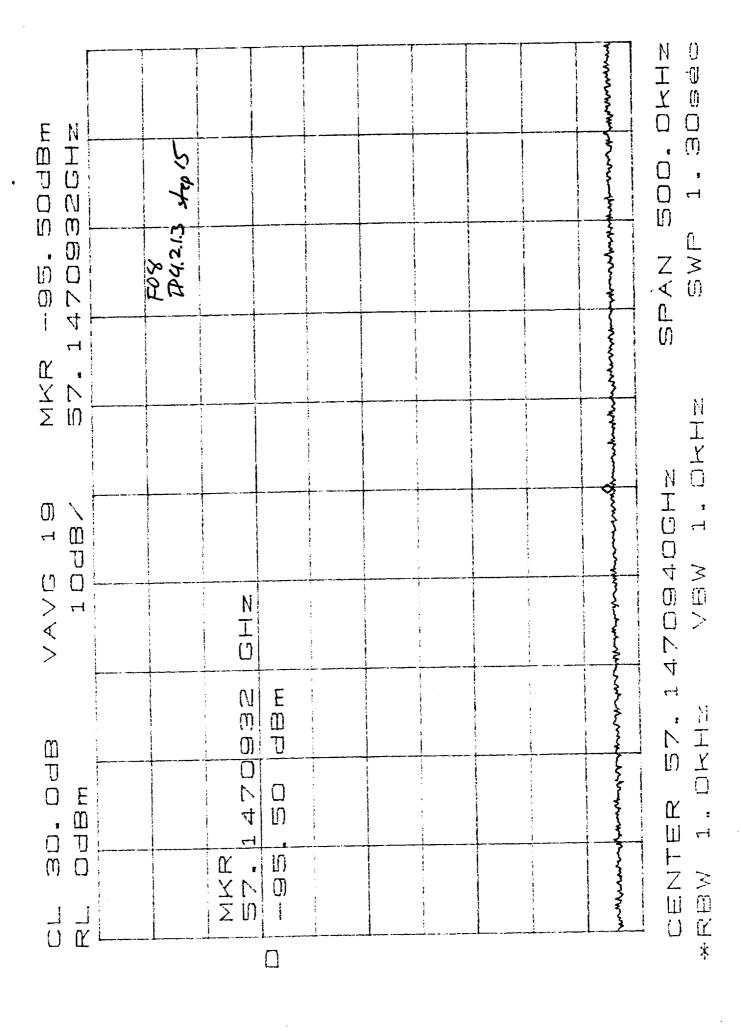
Step	Test	Expected	Measured	Pass/Fail						
22	Spurious and Sub	-200 to -90 dBc	See Plots	Pass						
(Cont)	Power level of 114.58 GHz signal	<-10 dBm	dBm	Rass						
L	Load VSWR and Frequency Pulling									
	2:1 mismatch over 1λ	N/A	Worst Case Freq =	N/A						
	2:1 mismatch over 1\(\lambda\)	N/A	Worst Case Power = dB Reak	N/A						

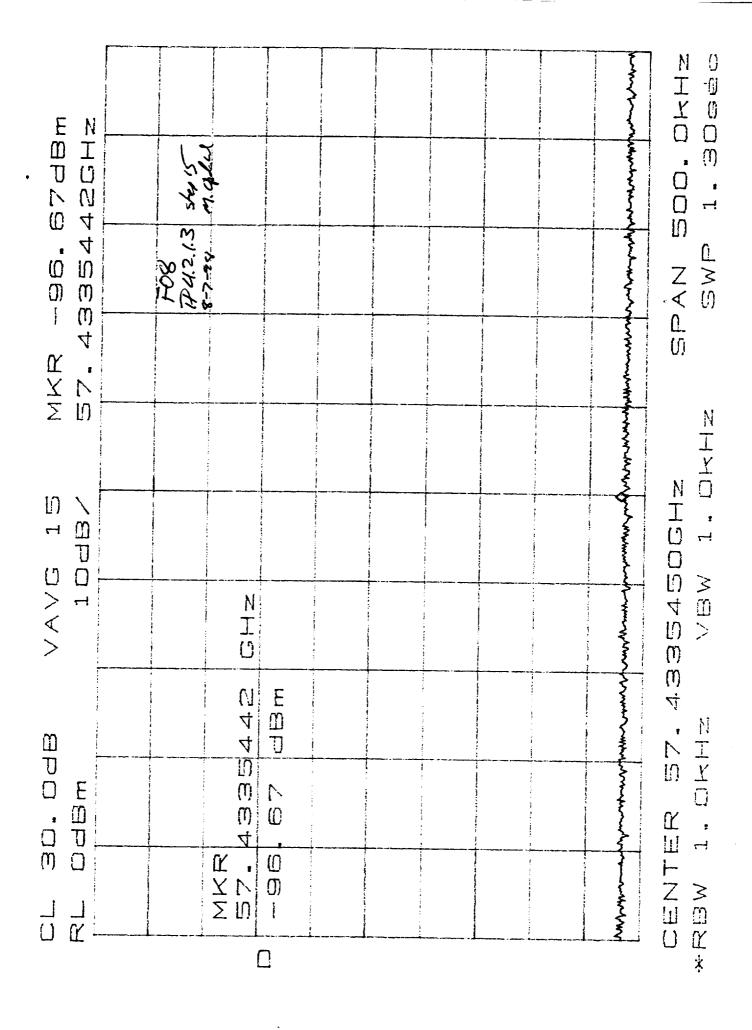






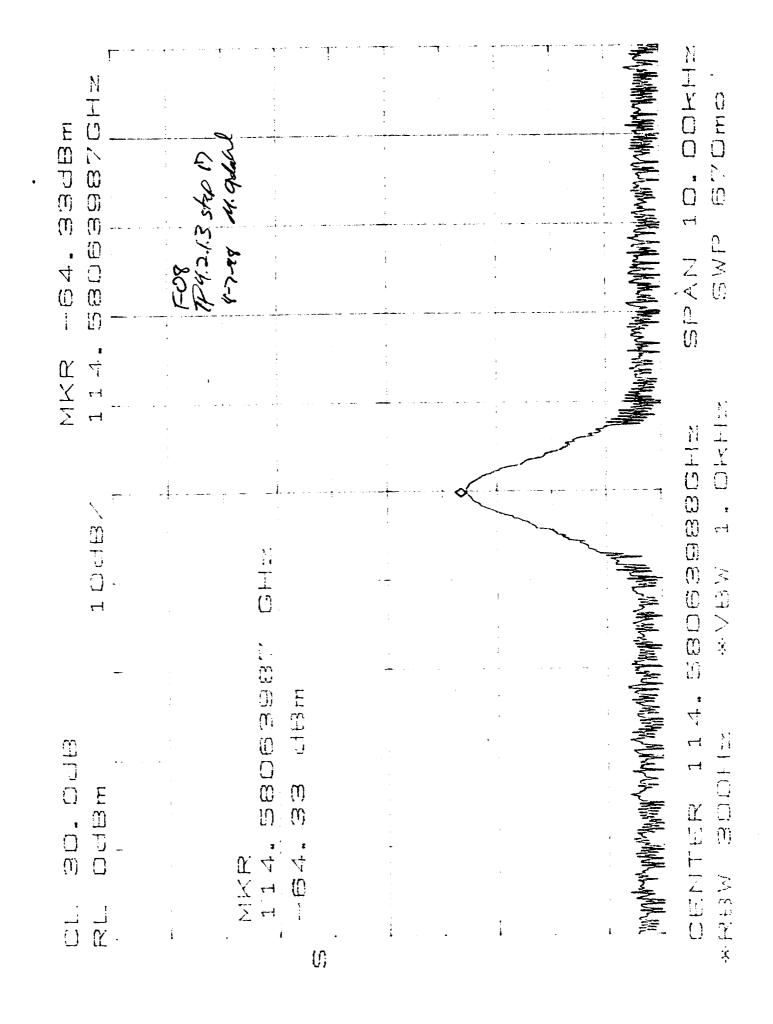


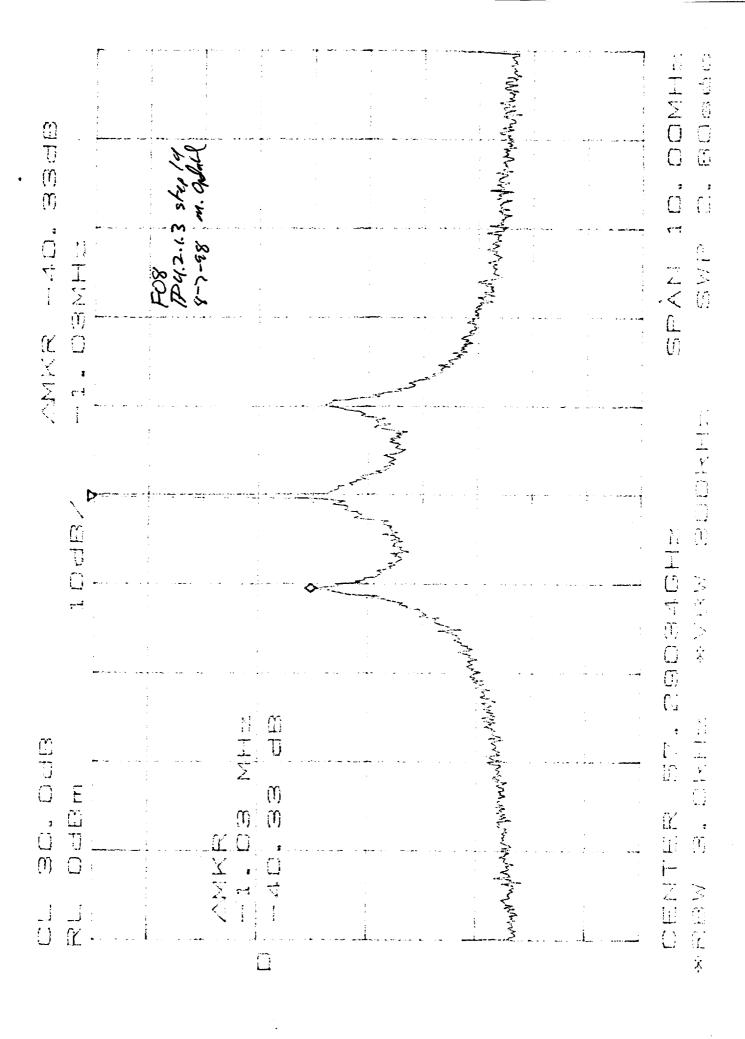


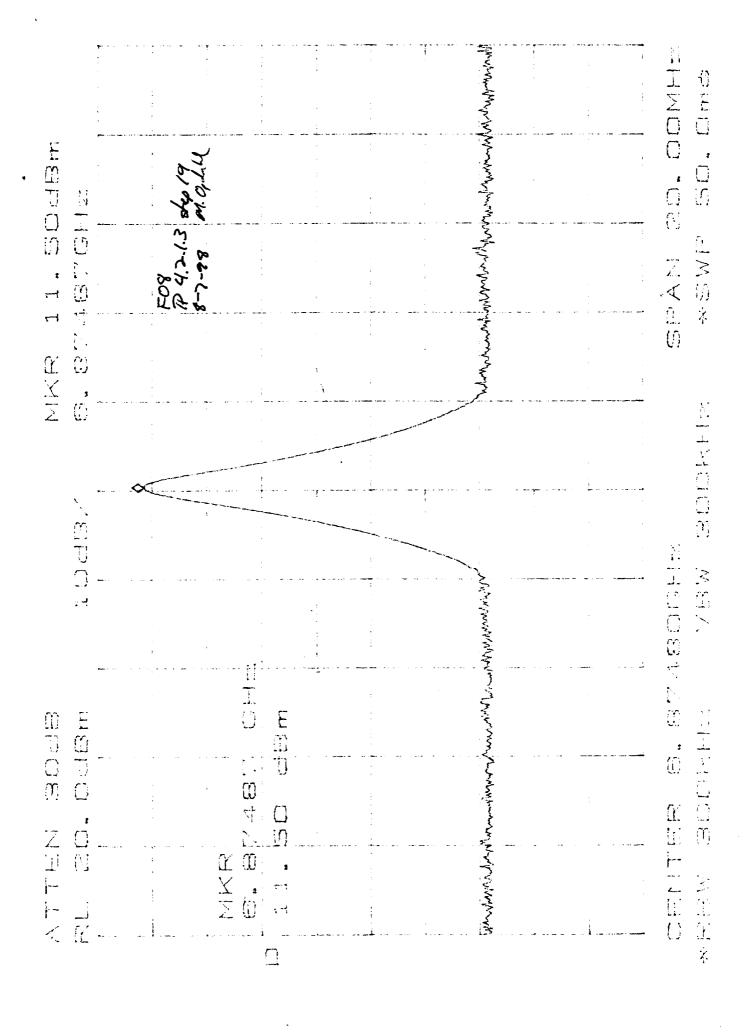


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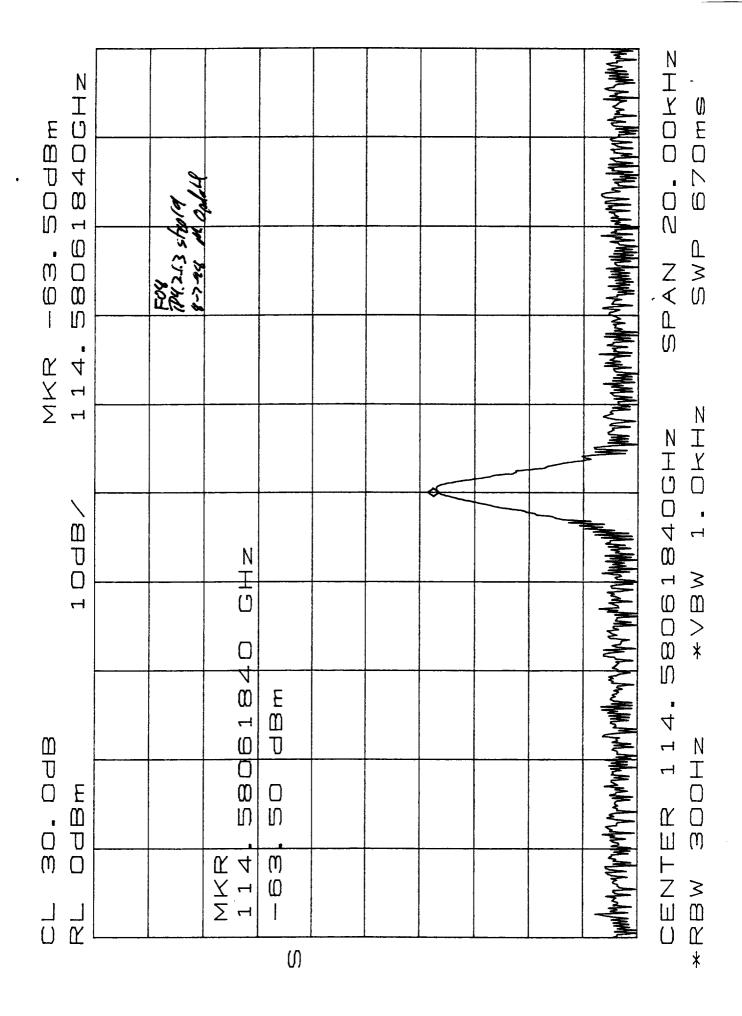
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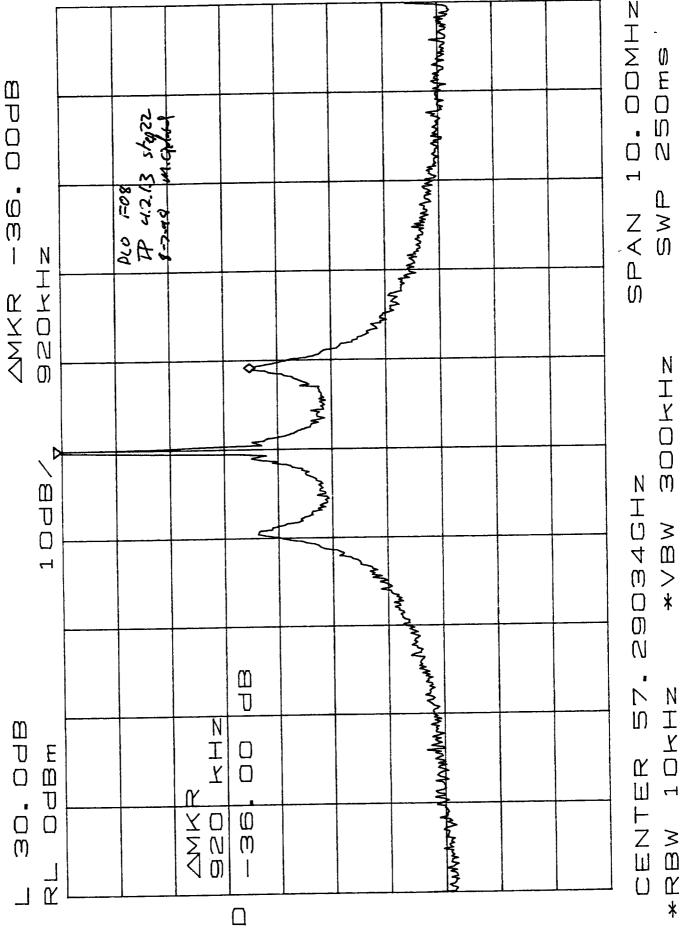
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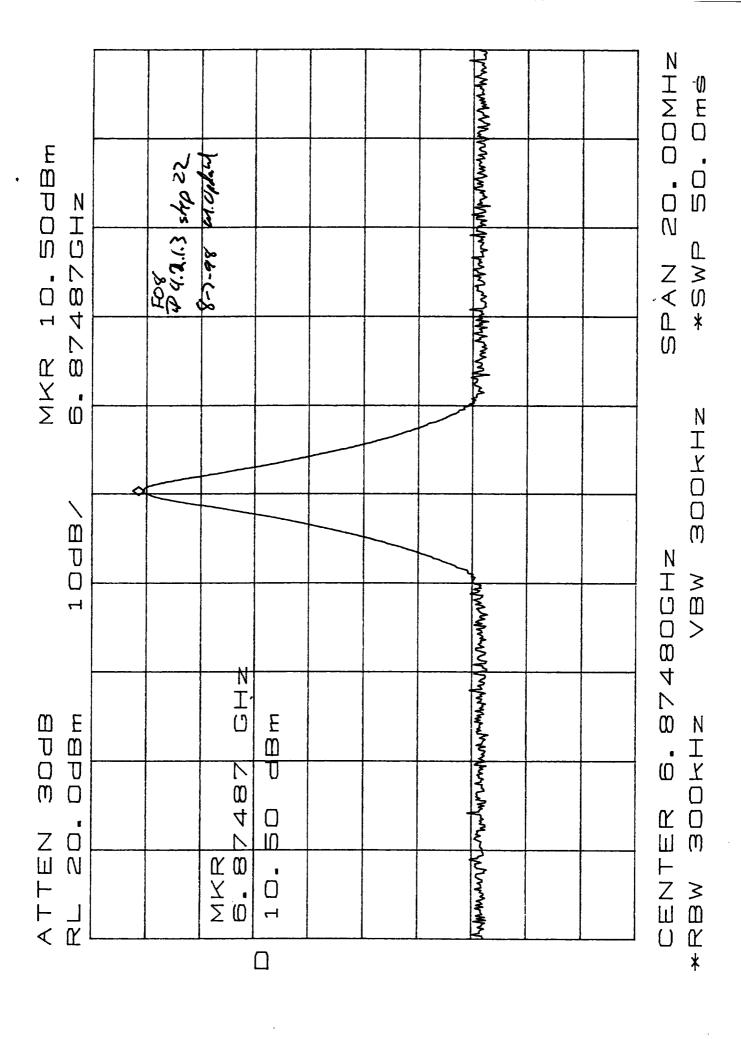
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Section 2A: Acceptance Level Vibration - F07

This section includes the data from the limited functional tests which take place before and throughout vibration, and the vibration-specific. The following table summarizes the results of the limited functional test.

Test	Expected Value	Post X axis	Post Y axis	Post Z axis
Output Frequency	57290344 ± 200 kHz	57290309 kHz	57290307 kHz	57290302 kHz
Output Power	18.5 dBm ± 1.5 dB	19.6 dBm	19.5 dBm	19.5 dBm

The following pages contain the raw data.

TEST DATA SHEET 8B

Limited Functional Test (Paragraph 4.2.3)

Post X-Axis LPT							
Test Se	etup Verified: Signature	Ph. U	· · · · · · · · · · · · · · · · · · ·				
Paragra	aph 4.2.3.2:						
Step		Test	Required	Measurement	Pass/Fail		
3	Potential Difference						
	From	То					
	Power Supply RTN	Test Platform *	< 1.0 Vac	NA-			
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	0.05 WK	Pass		
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	0.04 UGE	Pag		
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Step	Test	Expected		sured	Pass/Fail		
8	Voltage Meter 1	+15 ± 0.1 V		<u>0</u> v	Ass		
	Voltage Meter 2	-15 ± 0.1 V		. <u>o</u> v	Pacs		
	Current Meter 1	600 mA max.		7.6 mA	Pasy		
	Current Meter 2 100 mA max.		6	Pass			
9	Output Frequency 57.290344 ± .0001 GHz		57, 290	3093 GHZ	Pers		
10	Output Power	18.5 dBm ±1.5 dB	19.	6 1Bm	Pess		
axis, che	ck potential difference between	d in test. Example: If PLO is to be a shaker table and power supply RT	TN.				
Operation Unit Ser	rder No.:	Test Enginee Quality Cont	10/100	LALL Gergelei 1 _{5/9} k	2/2/28 7A 263)		

TEST DATA SHEET 8C

Limited Functional Test (Paragraph 4.2.3)

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Test Setup Verified:

Paragraph 4.2.3.2:

Post	Y-AXIS	LPI	

Step	Test		Required	Measurement	Pass/Fail
3	Potential Difference				
	From	То		<	
	Power Supply RTN	Test Platform *	< 1.0 Vac	N/A	N/A
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	0.05 Yac	Pass
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	0.02 Vac	Pass

Step	Test	Expected	Measured	Pass/Fail
8	Voltage Meter 1	+15 ± 0.1 V	15.0V	Pass
<u> </u>	Voltage Meter 2	-15 ± 0.1 V	-15.0_V	Pass
	Current Meter 1	600 mA max.	499.1 mA	Pass
,	Current Meter 2	100 mA max.	_67.1_mA	Pass
9 ,	Output Frequency	57.290344 ± .0001 GHz	57.290307 GHz	Pass
10	Output Power	18.5 dBm ±1.5 dB	19.5 dBm	Pass

* If used. N/A this line entry if not used in test. Example: If PLO is to be vibrated and unit tested "in-place" after each axis, check potential difference between shaker table and power supply RTN.

Shop Order No.: 534921

Operation: 0150

Unit Serial No.: F07

Test Engineer:

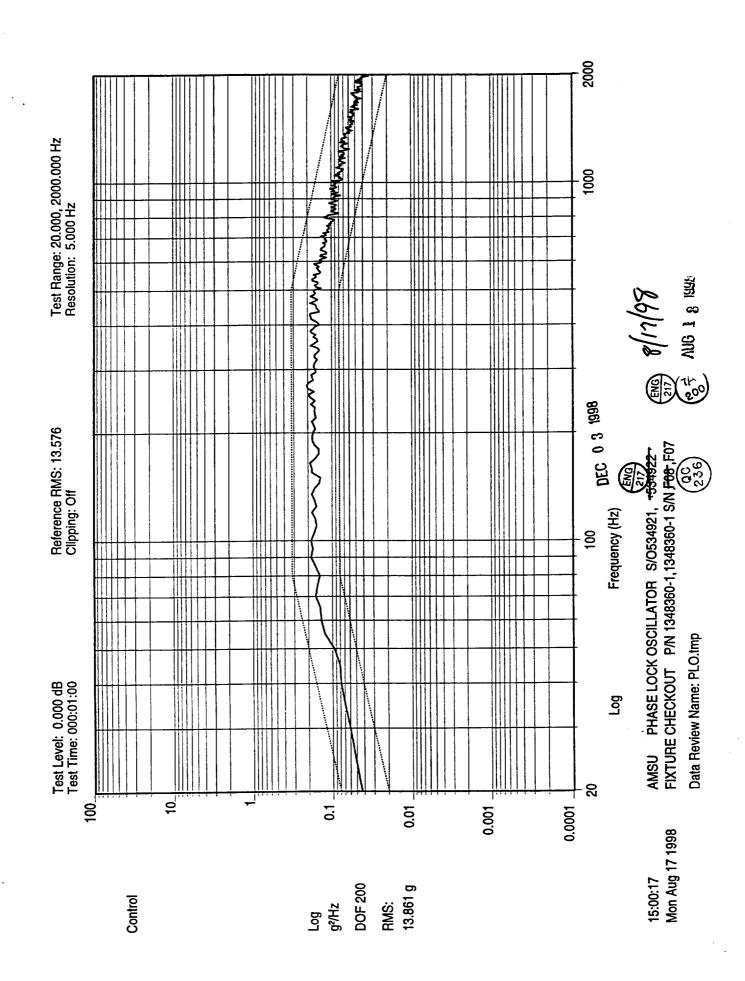
Quality Control:

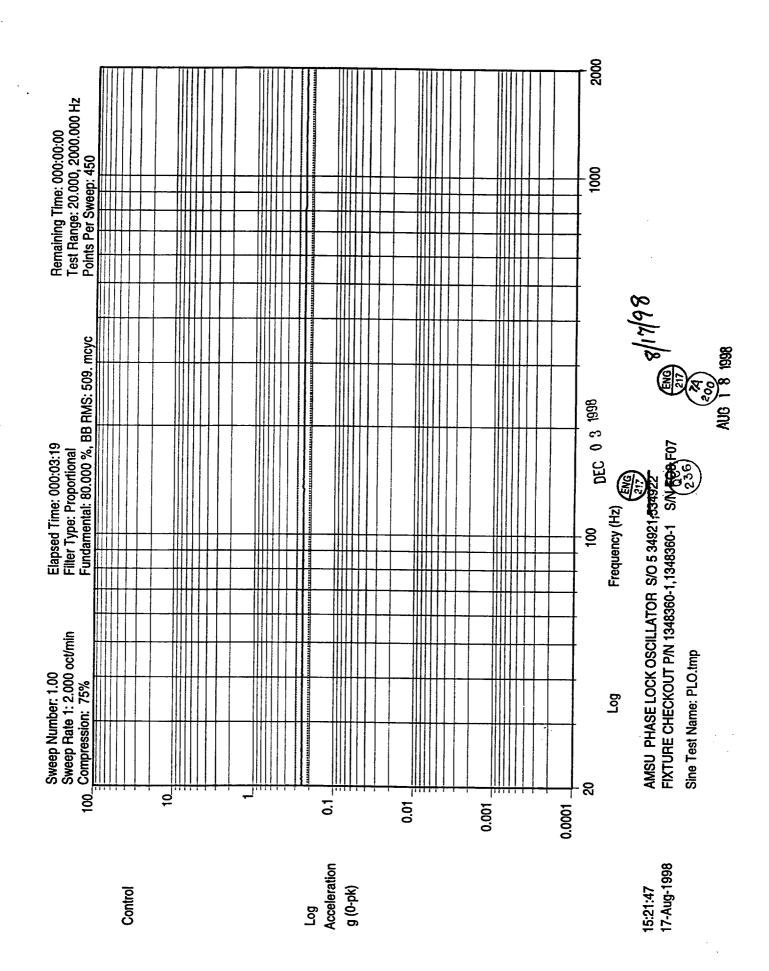
Govt. Rep.:

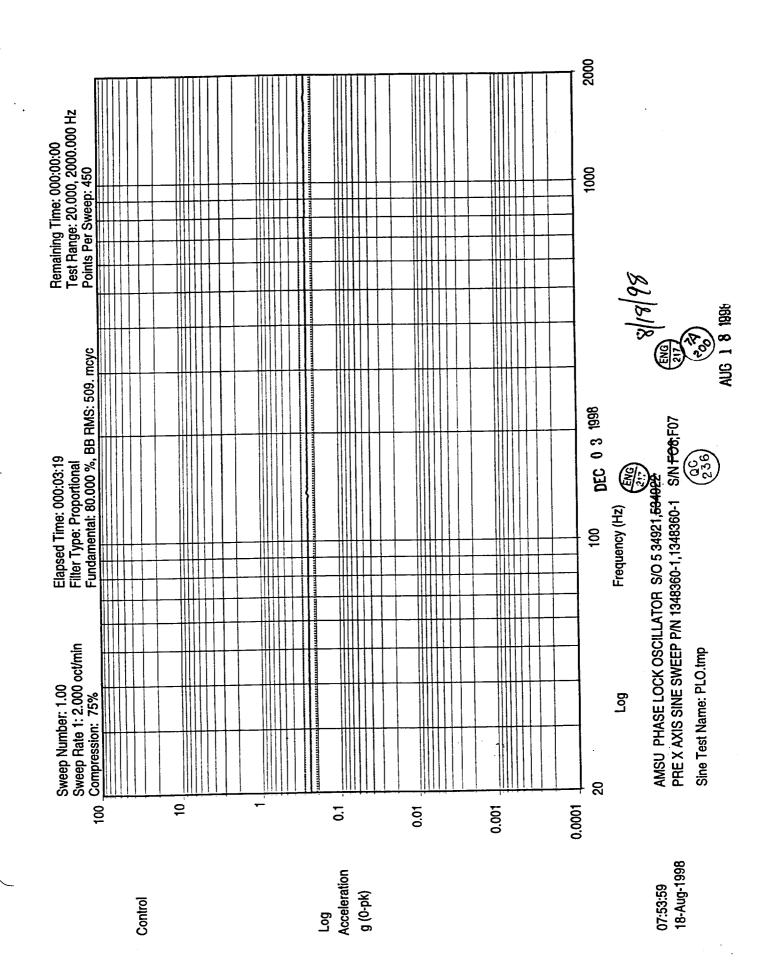
TEST DATA SHEET 8D

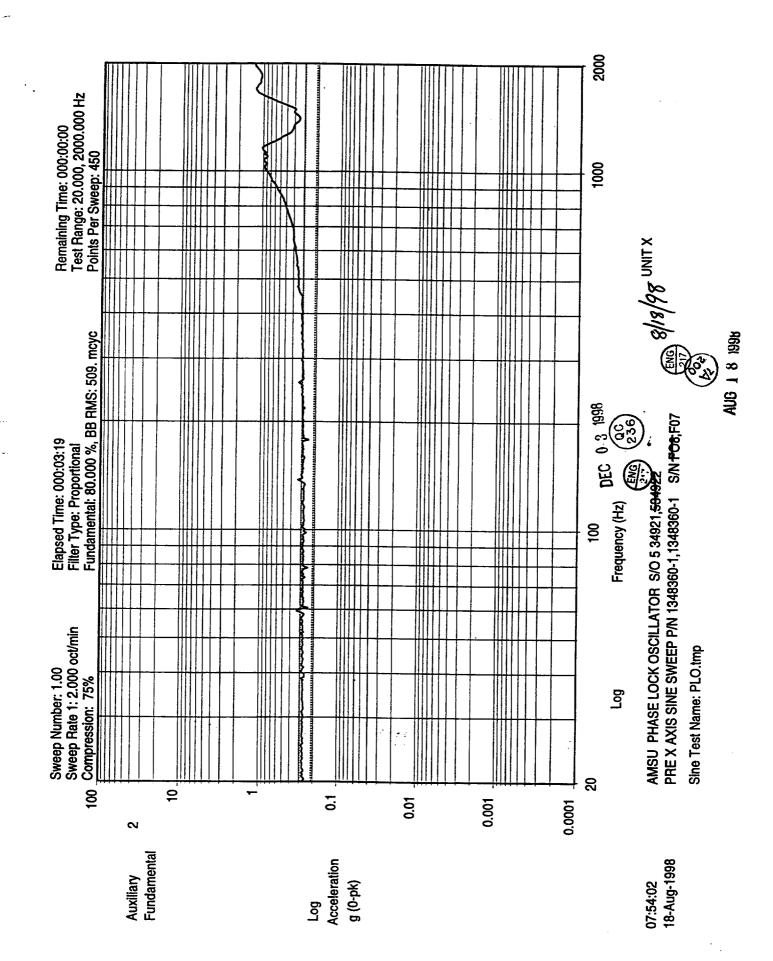
Limited Functional Test (Paragraph 4.2.3)

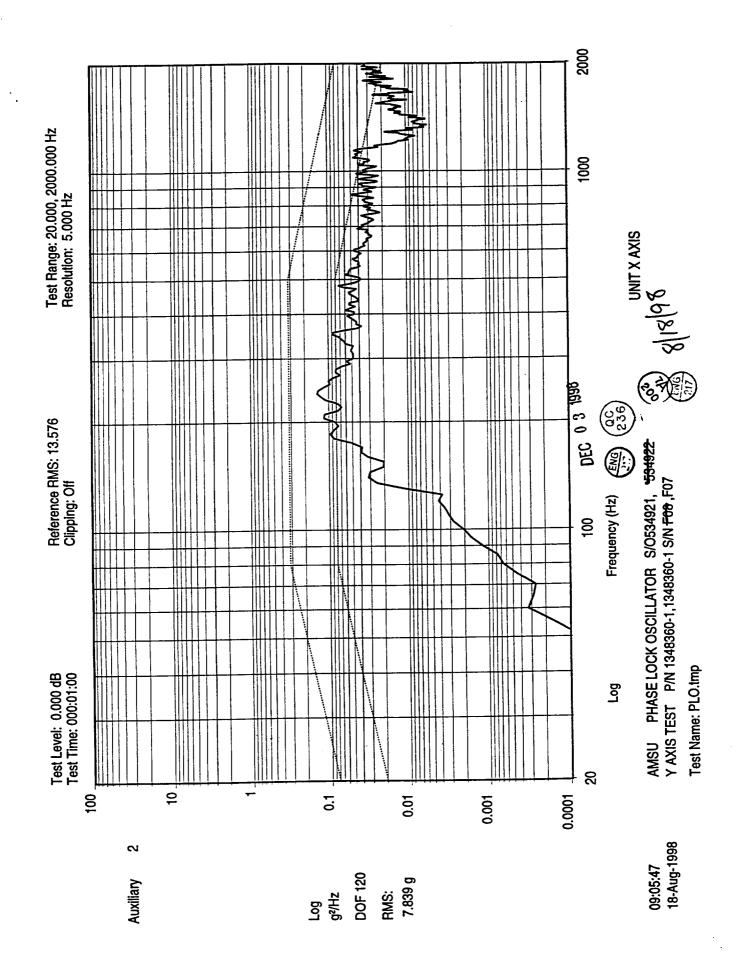
Post Z-Axis LPT						
Test Setup Verified: Mel Signature						
Paragr	raph 4.2.3.2:				·	
Step		Test	Required	Measurement	Pass/Fail	
3	Potential Difference					
	From	То			,	
	Power Supply RTN	Test Platform *	< 1.0 Vac	N/A	N/A	
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	0.05 VAC		
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	0.04 VAC	PASS	
Step	Test	Expected		sured	Pass/Fail	
8	Voltage Meter 1	+15 ± 0.1 V	<u>+ 15.0</u> V		PASS	
	Voltage Meter 2	-15 ± 0.1 V	<u>-15.0</u> V		PASS	
	Current Meter 1	600 mA max.		.2_ mA	PASS	
	Current Meter 2	100 mA max.	<u>-67.</u>	IG mA	PASS	
9	Output Frequency	57.290344 ± .0001 GHz	57.2903 01 GHz		PASS	
10	Output Power	18.5 dBm ±1.5 dB	19.5	ter (2)	PASS	
		I in test. Example: If PLO is to be shaker table and power supply R		it tested "in-place"	after each	
Shop Order No.: 354921 Test Engineer: Test Engineer: Quality Control State Sta						
Unit Serial No.: Fo7 Govt. Rep.:						
Date:						

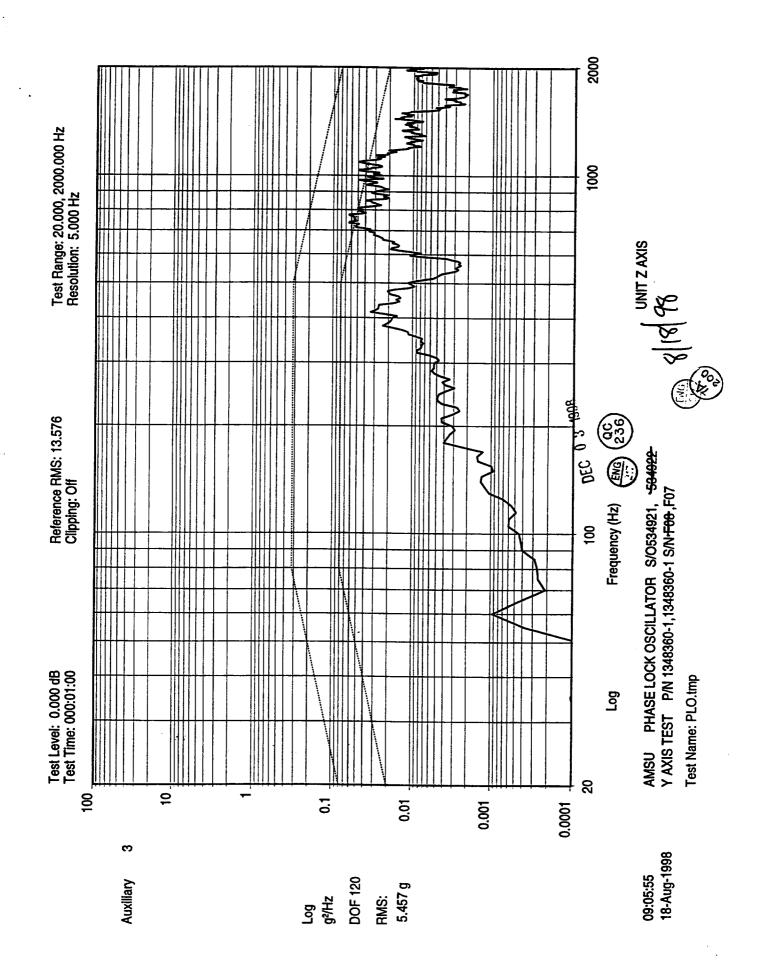


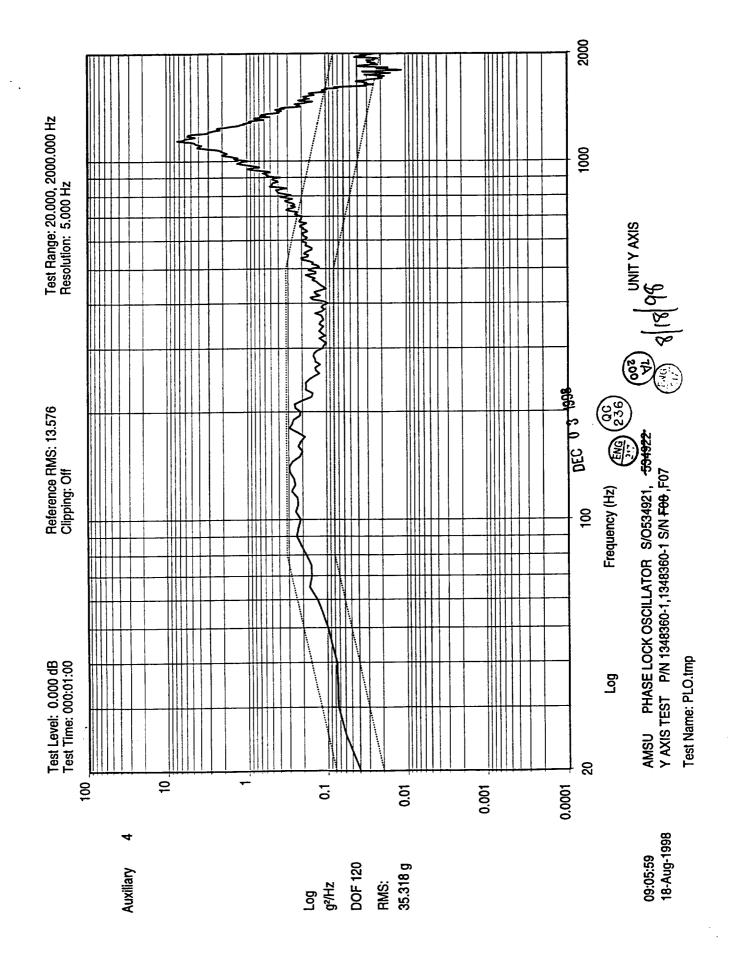


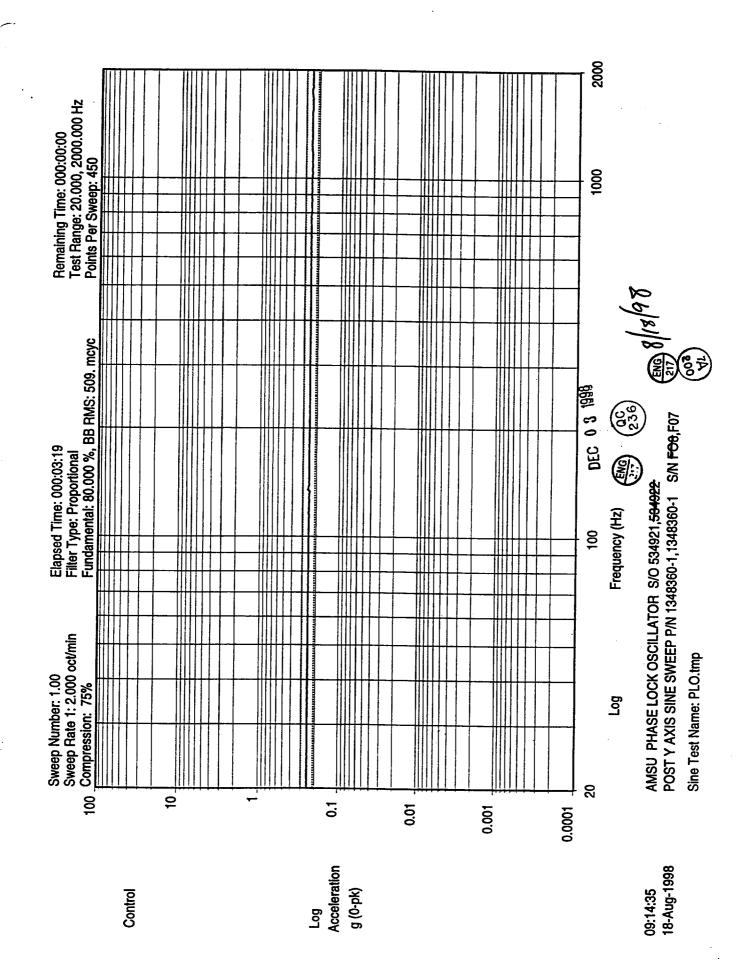


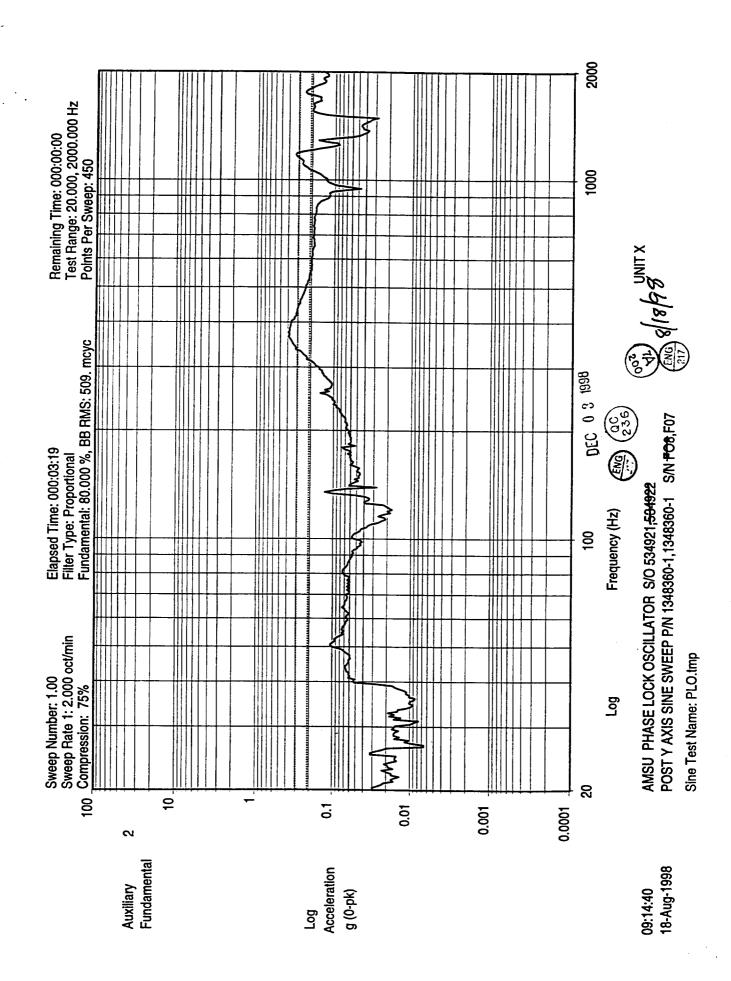


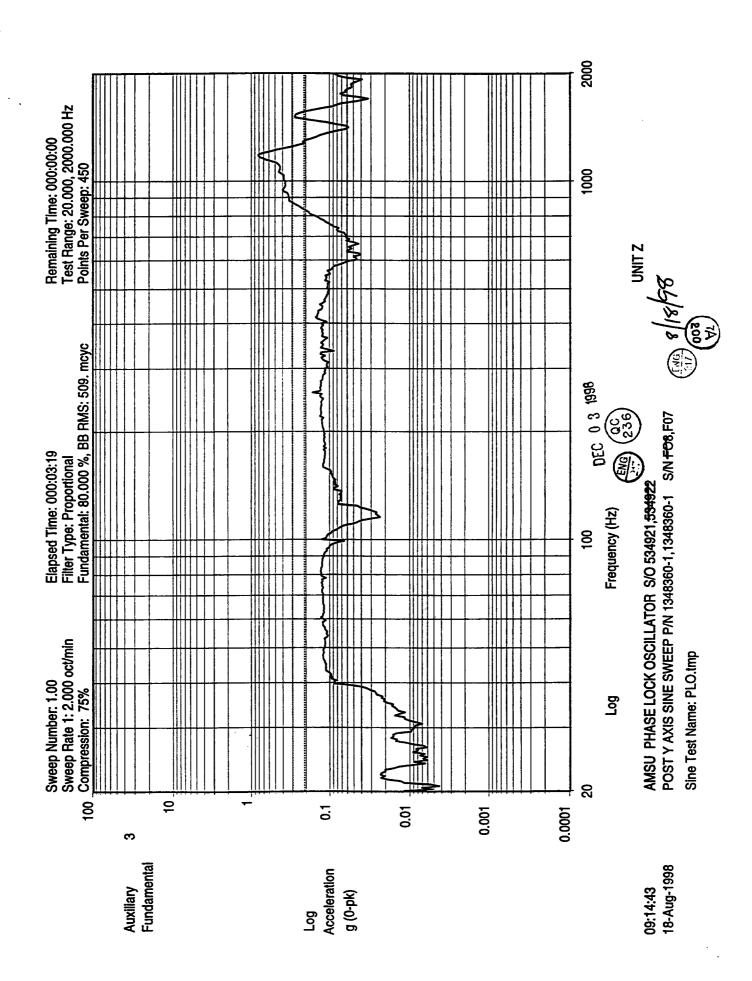


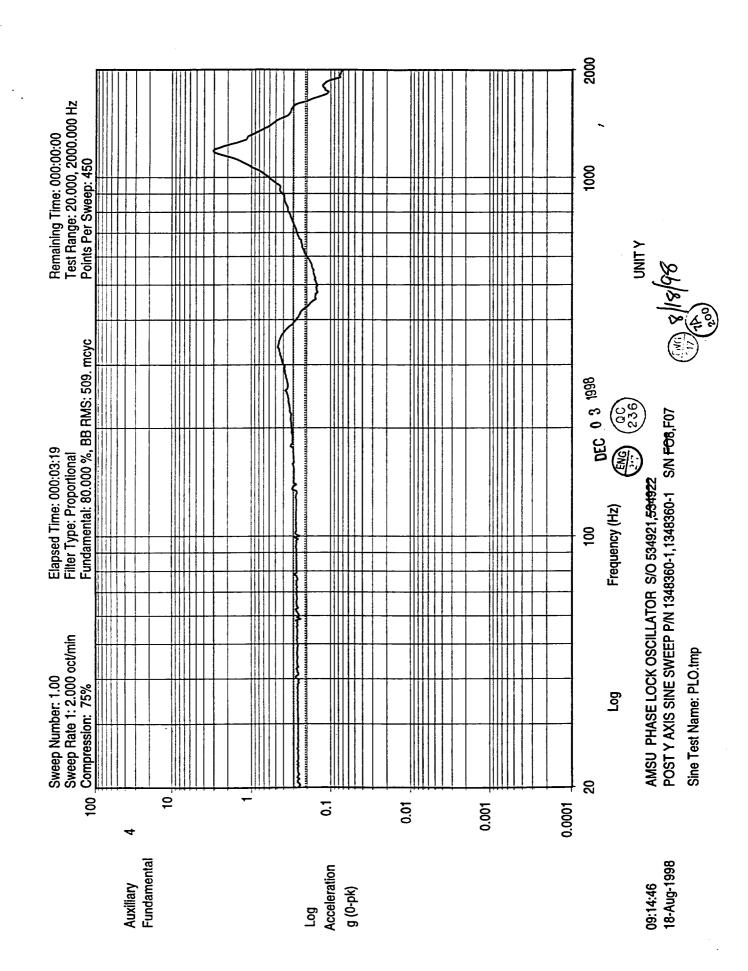




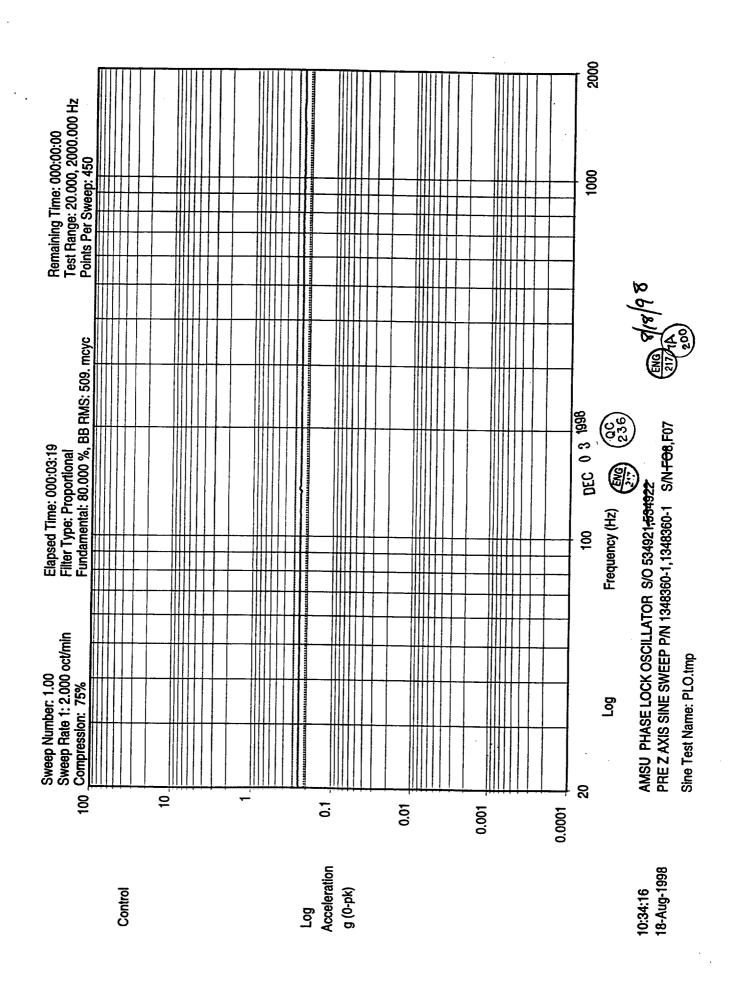


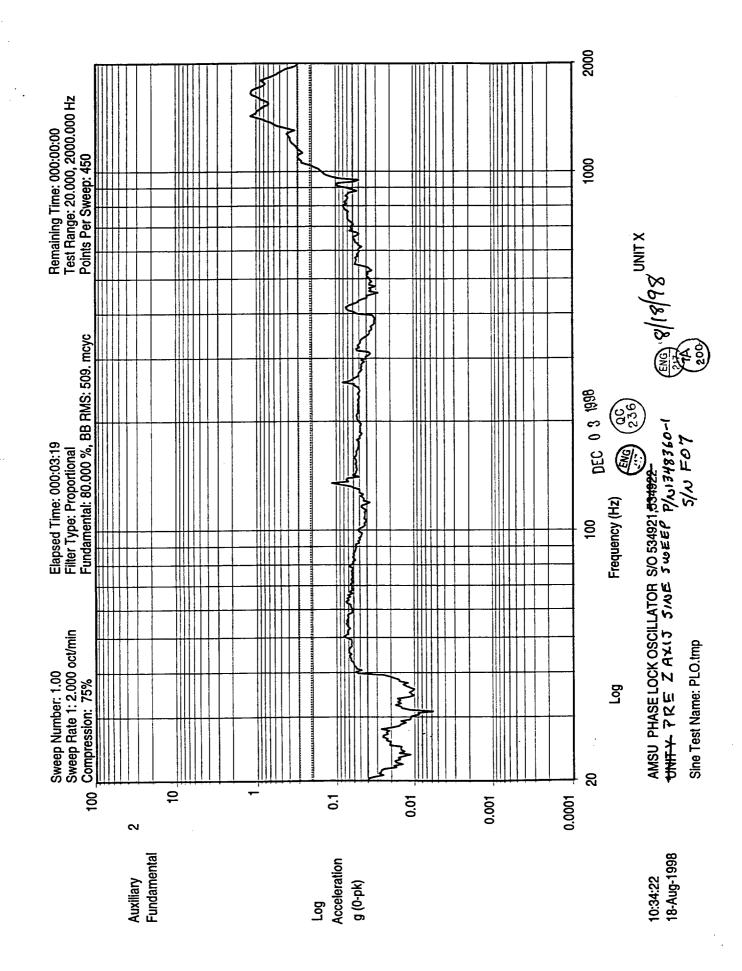


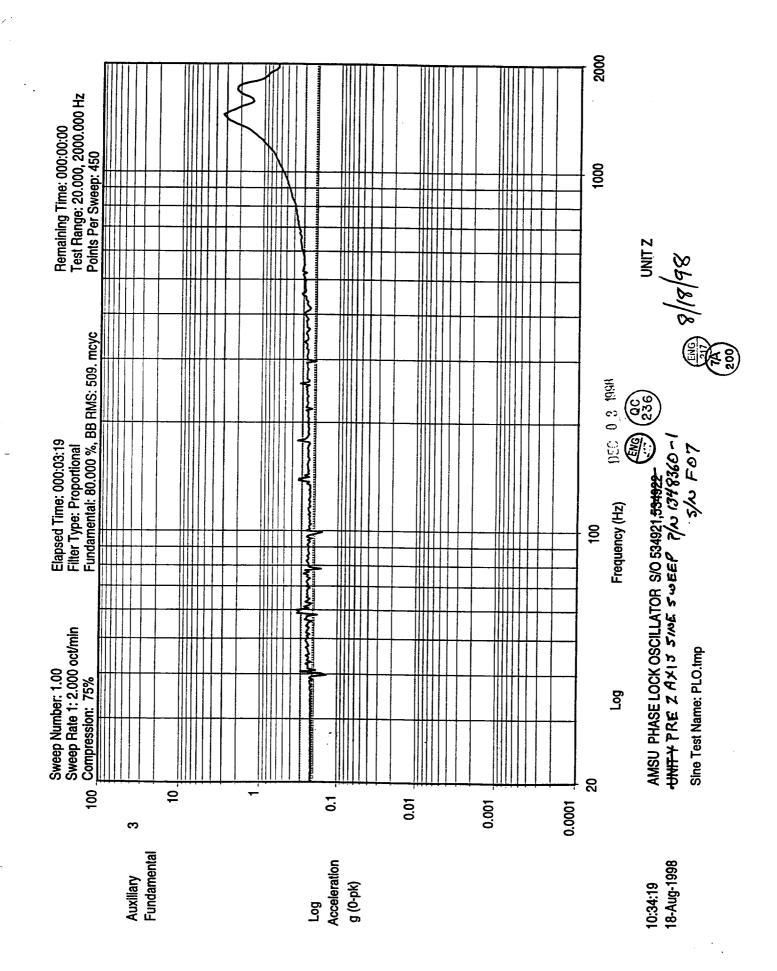


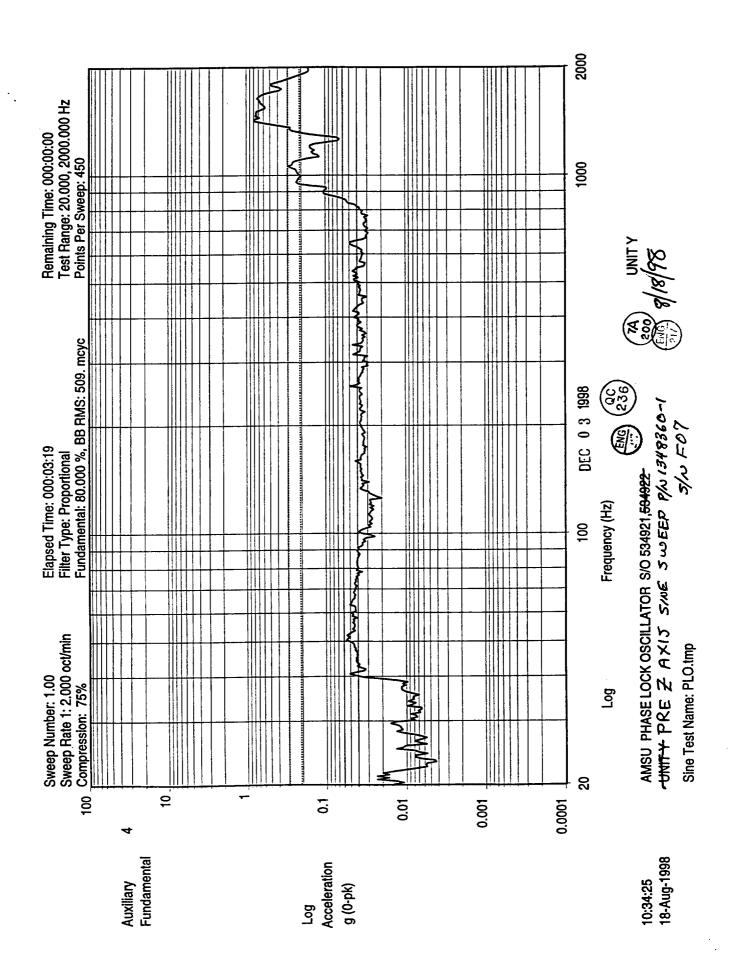


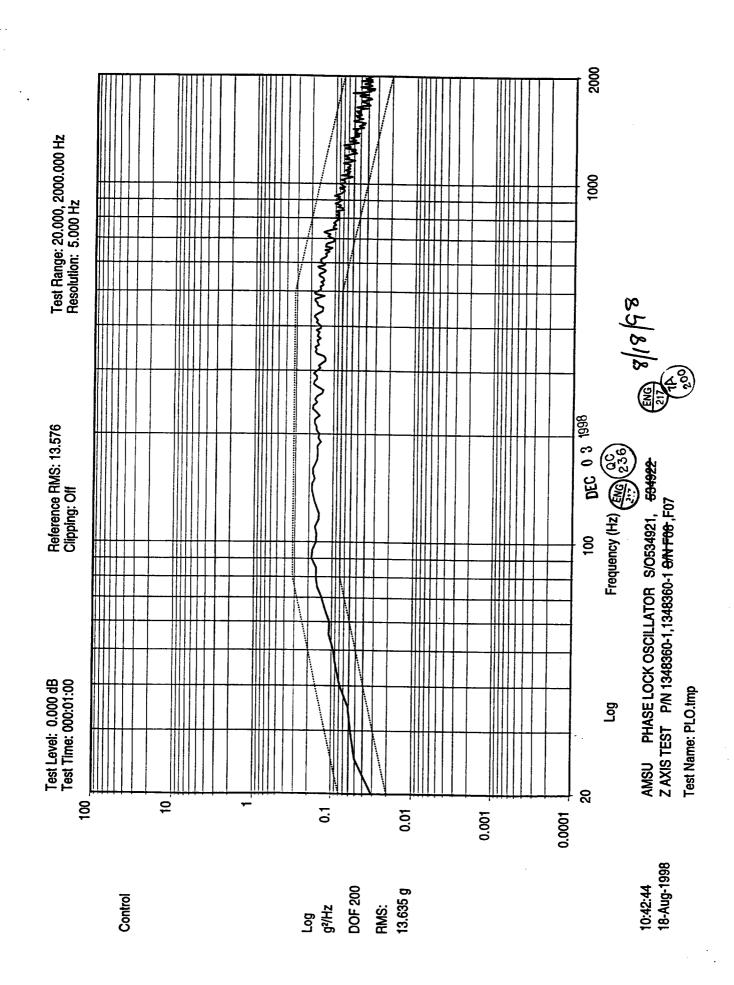
Ĺ

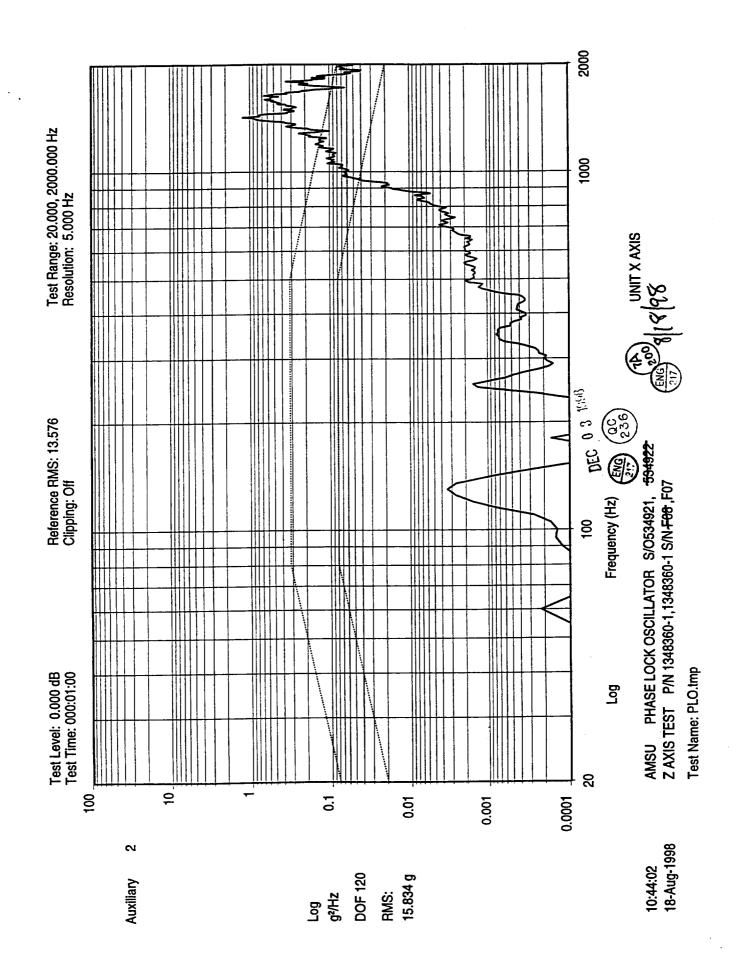


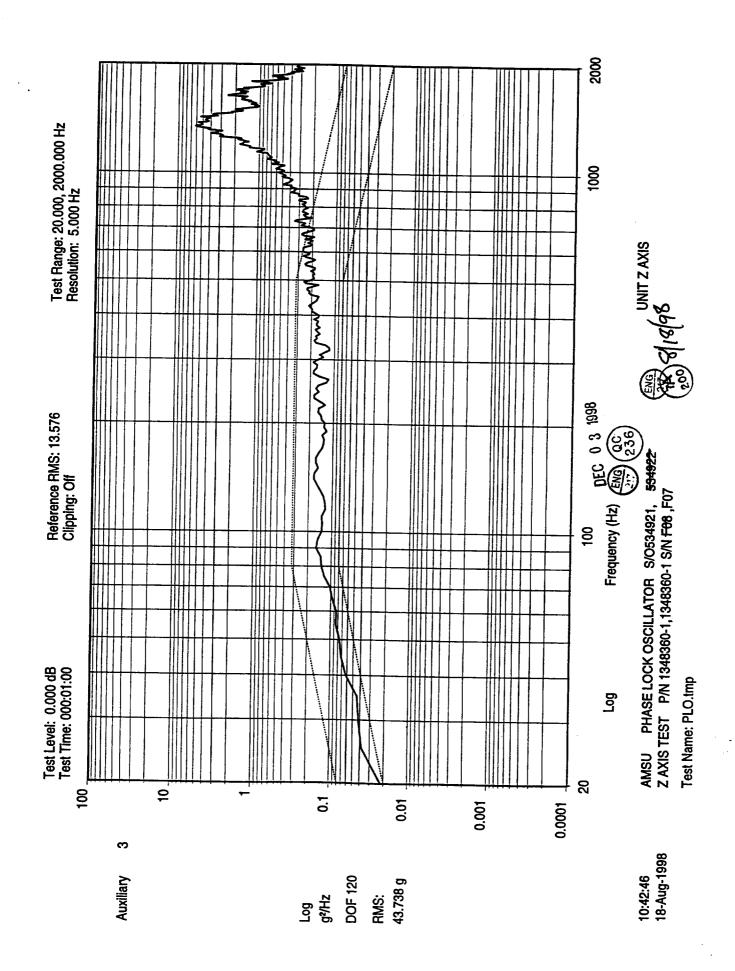


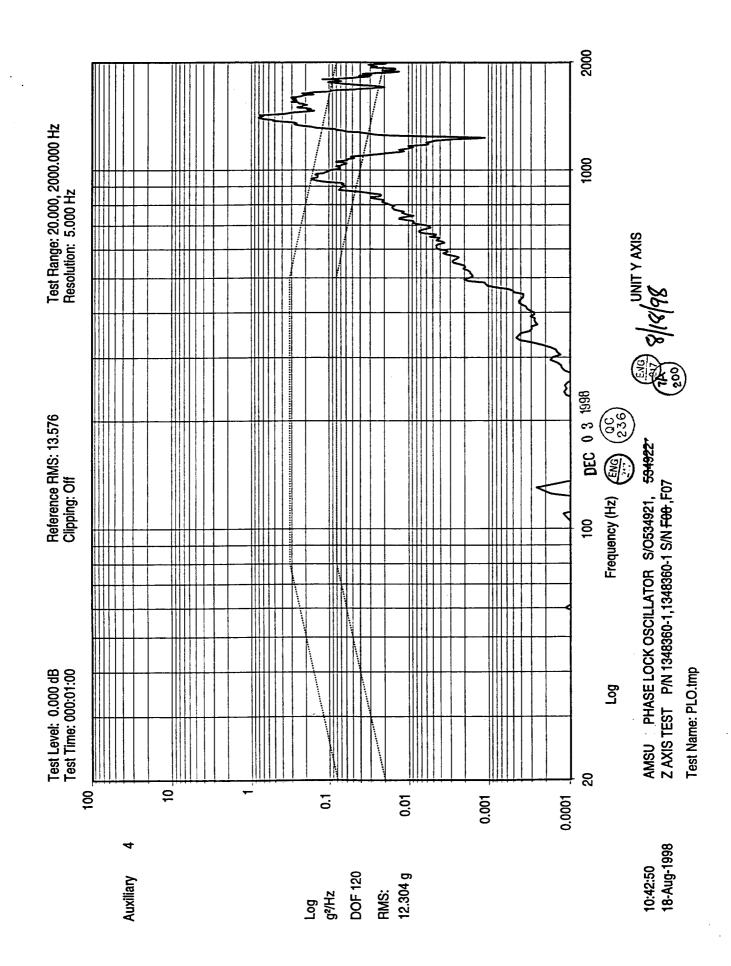


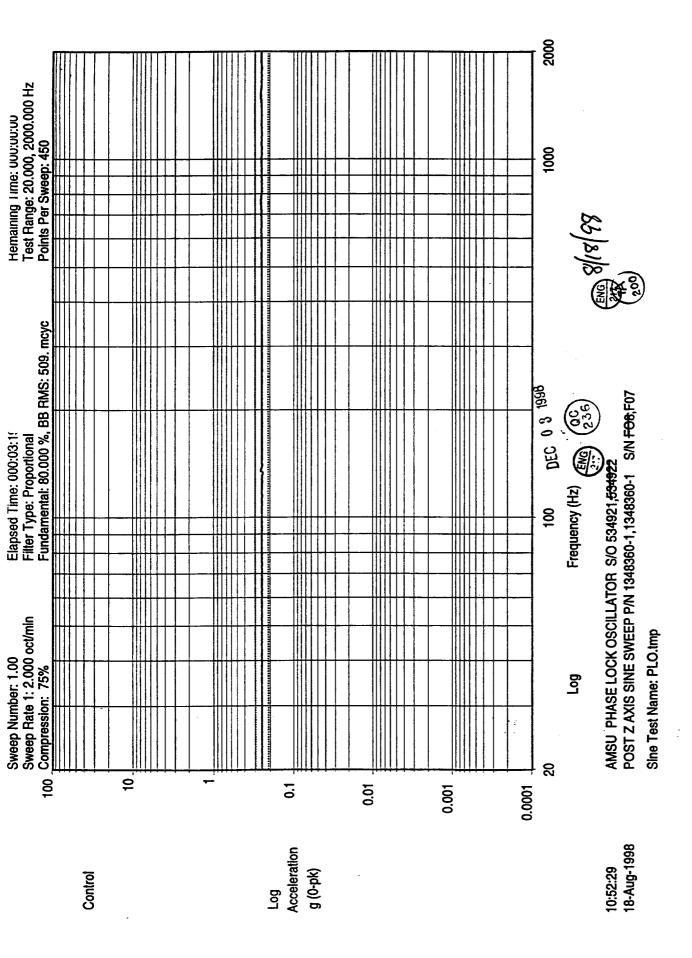




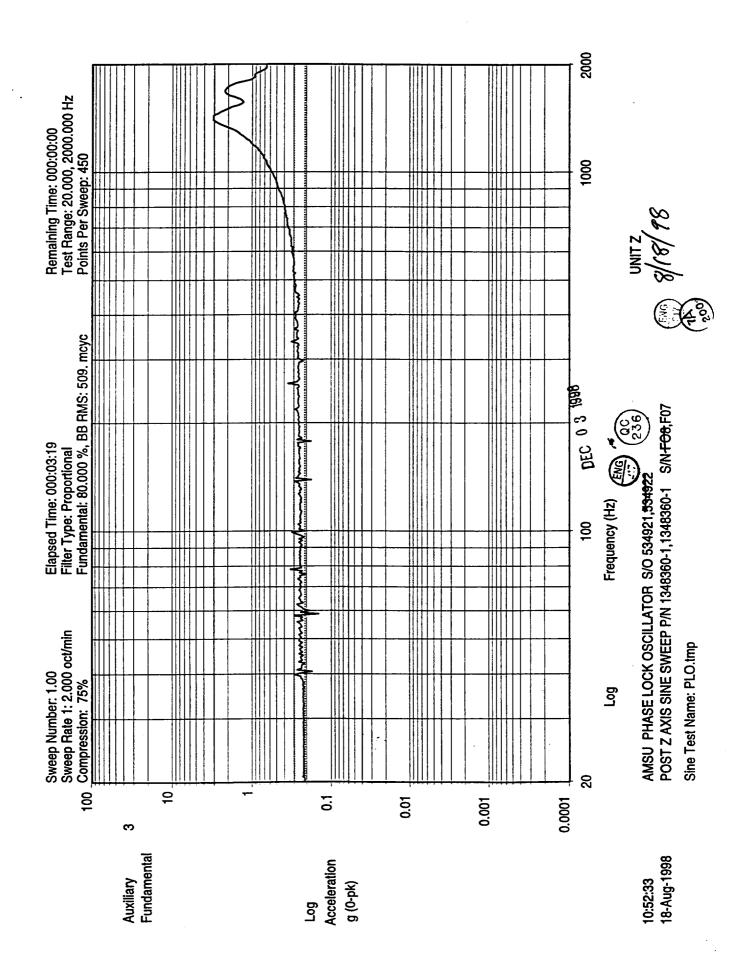


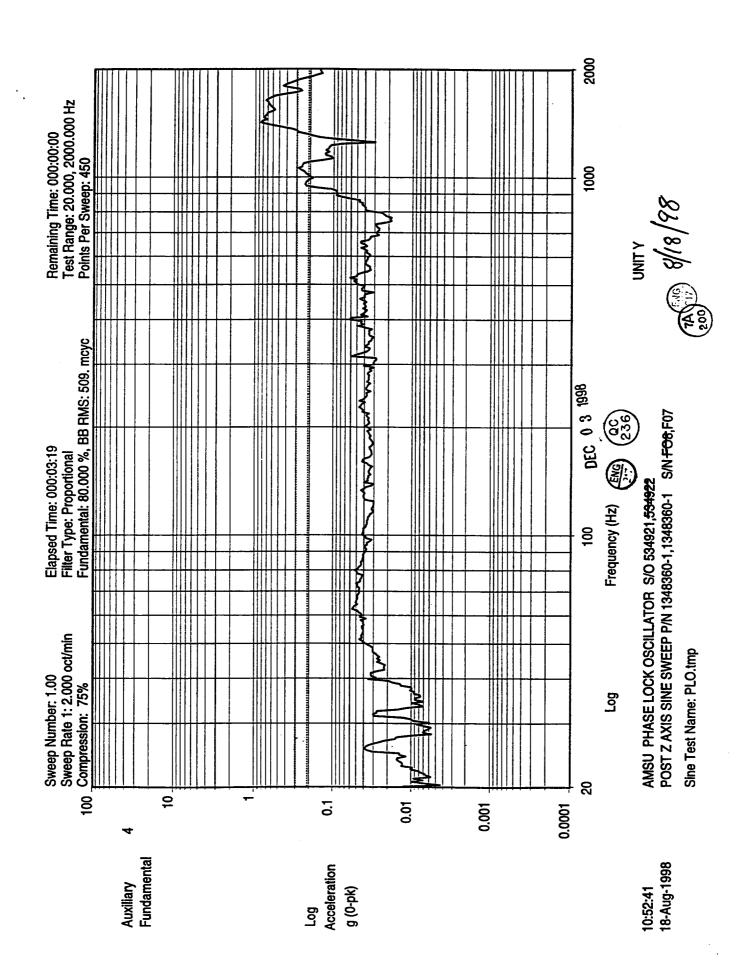


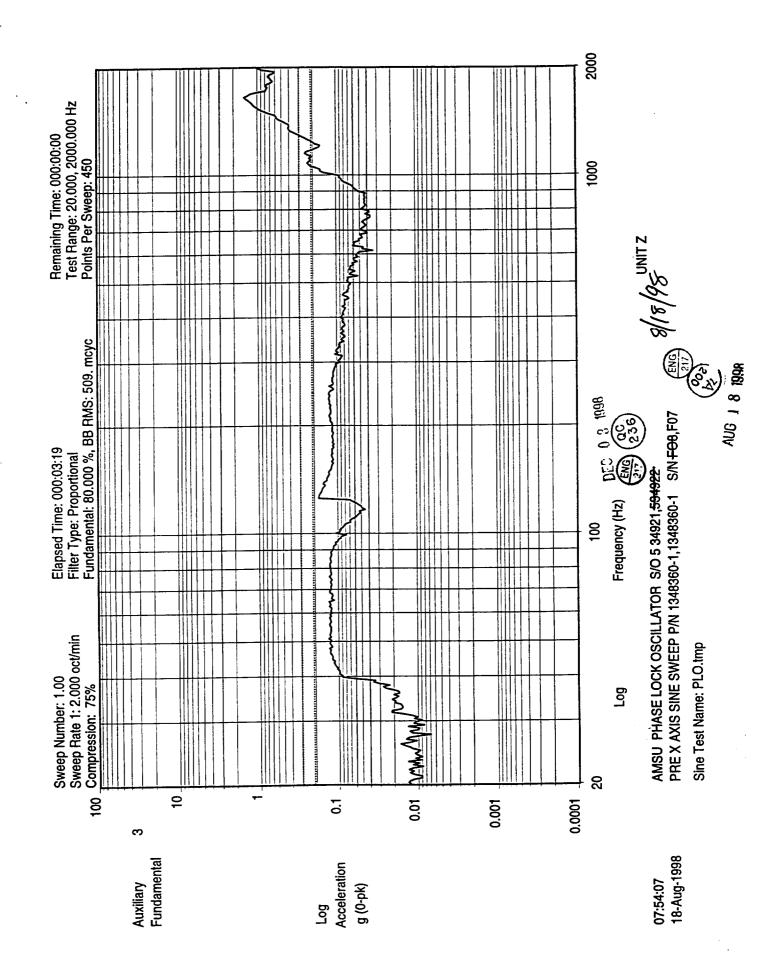


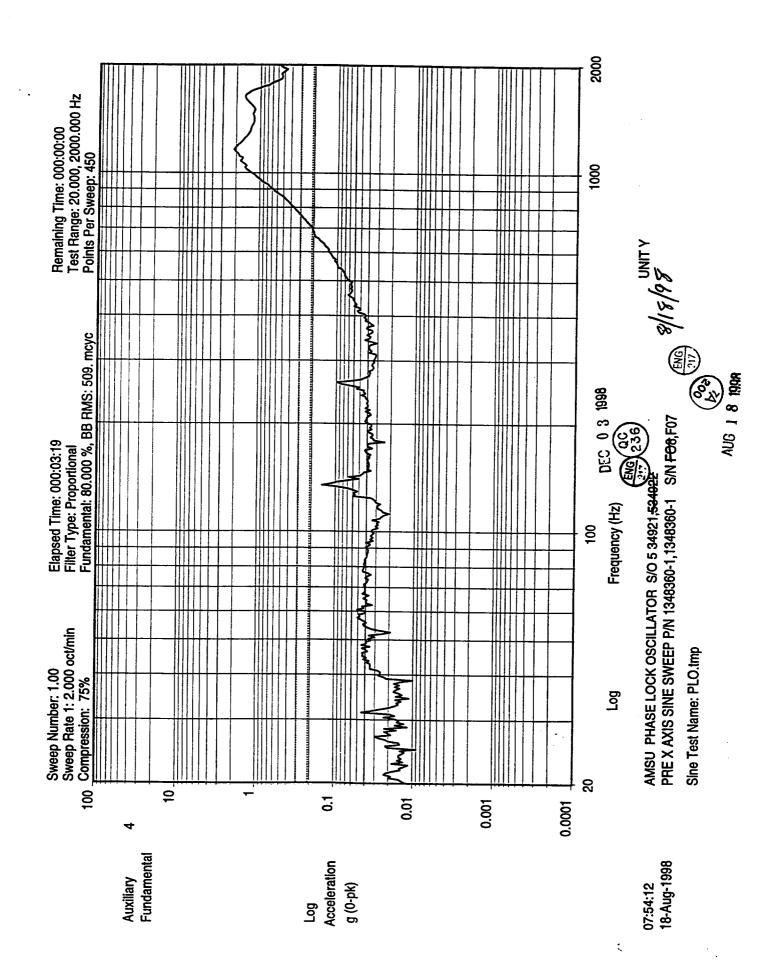


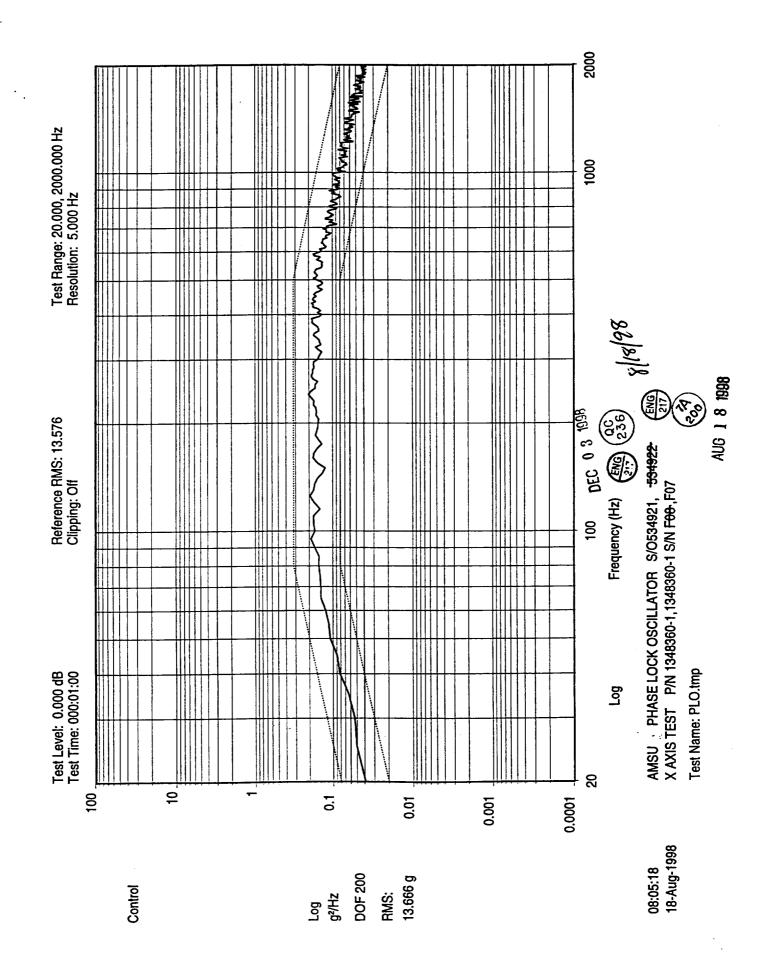


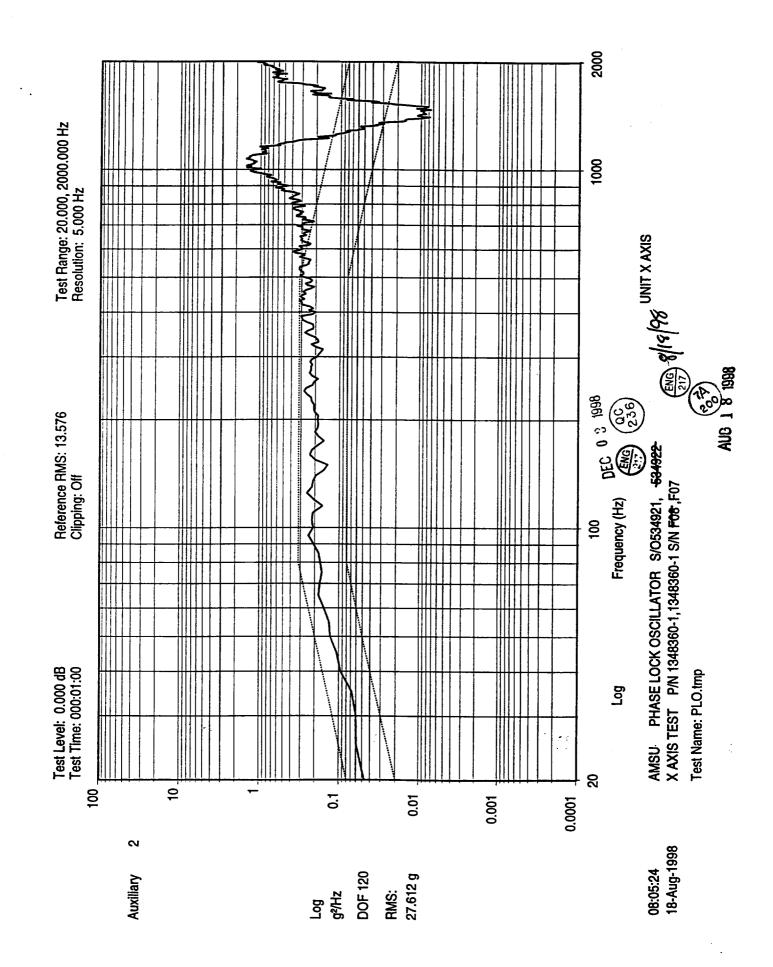


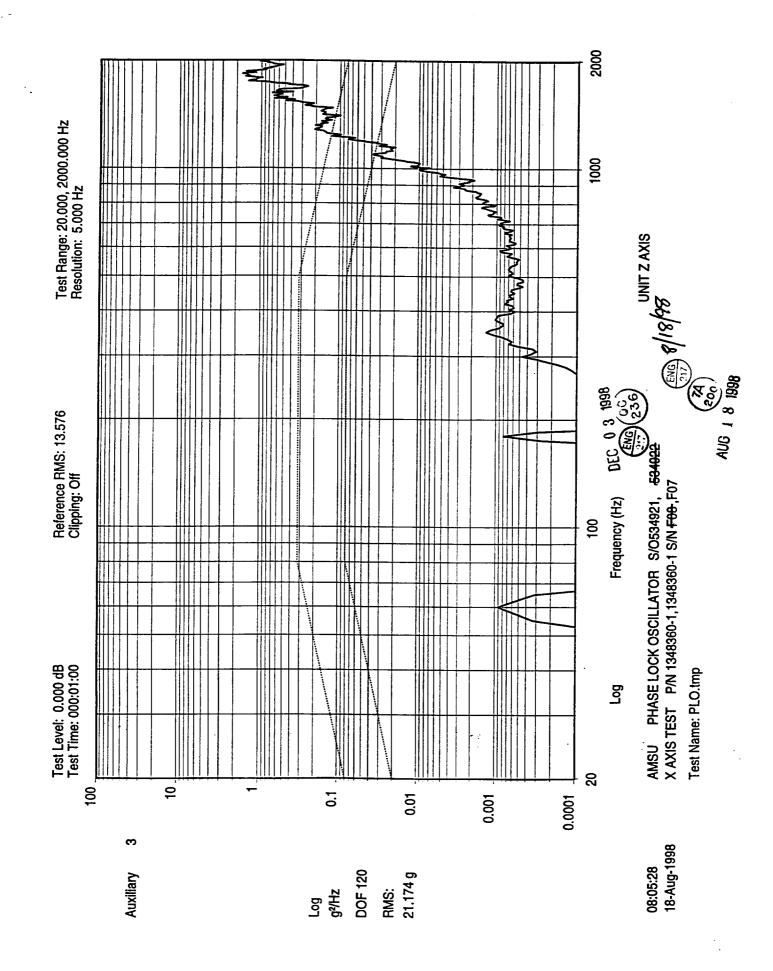


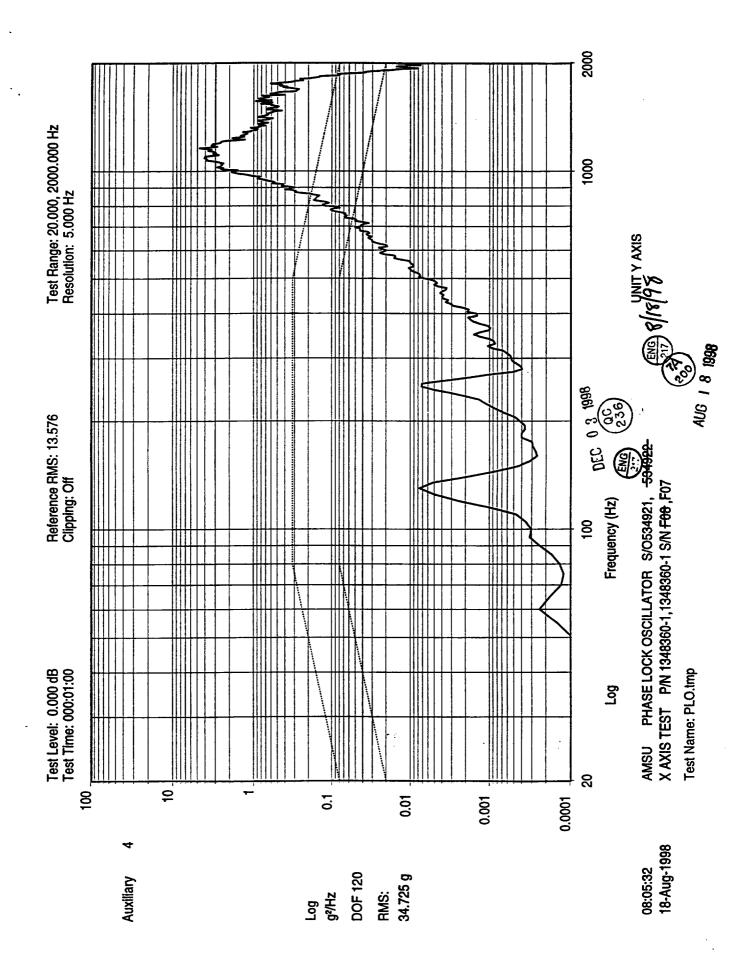


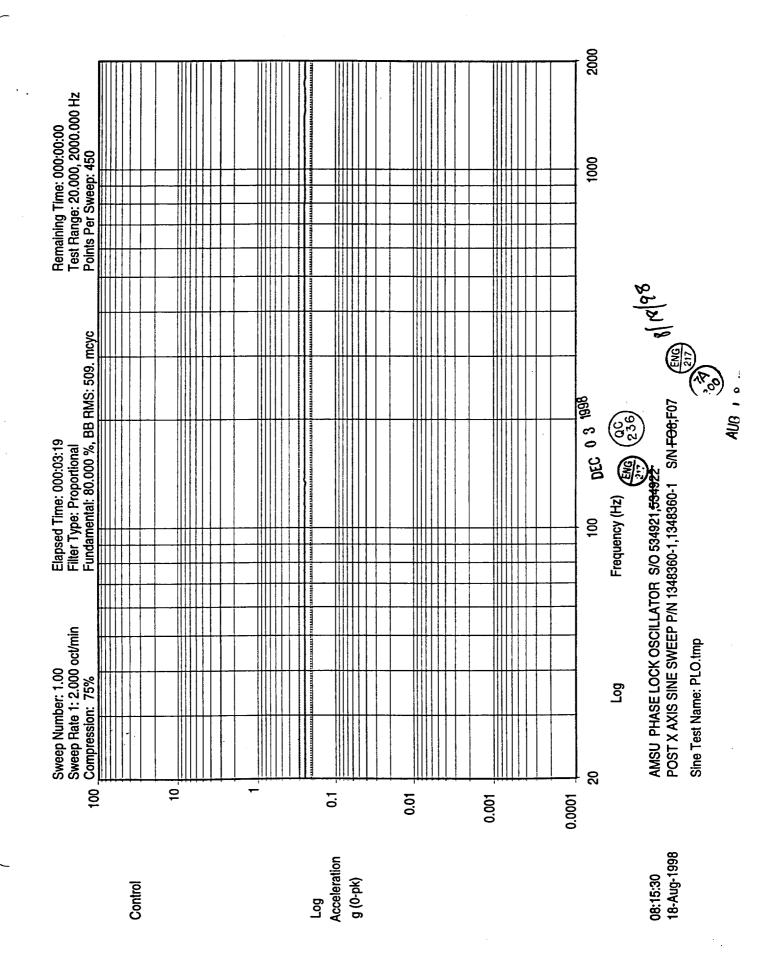


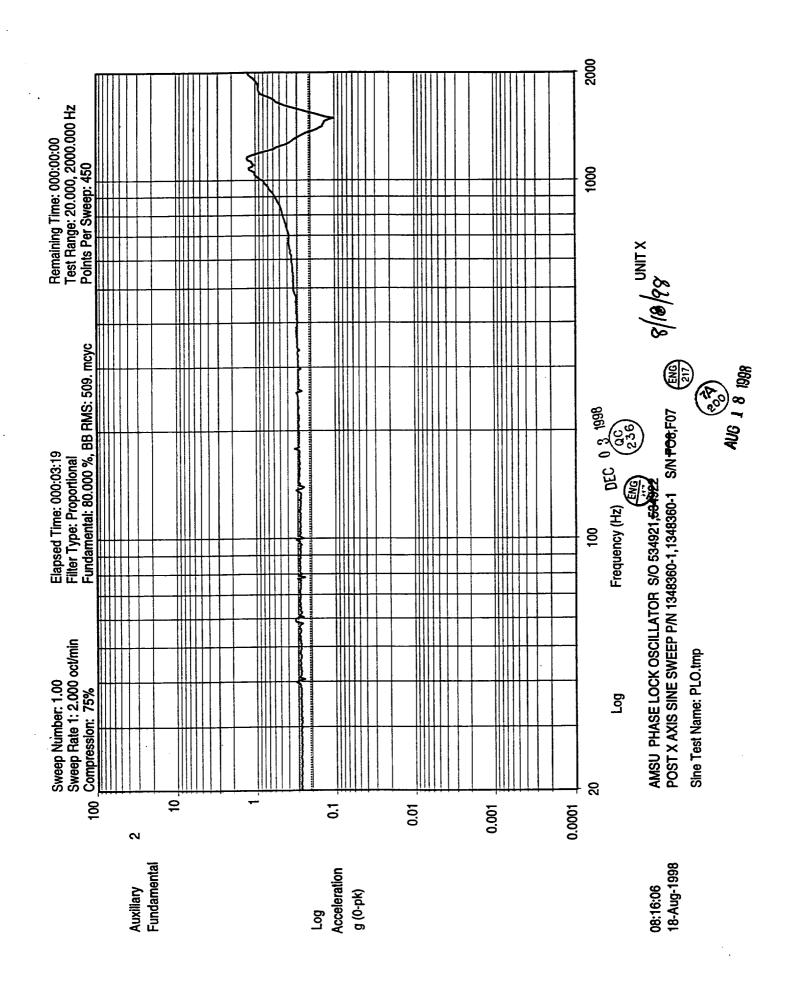


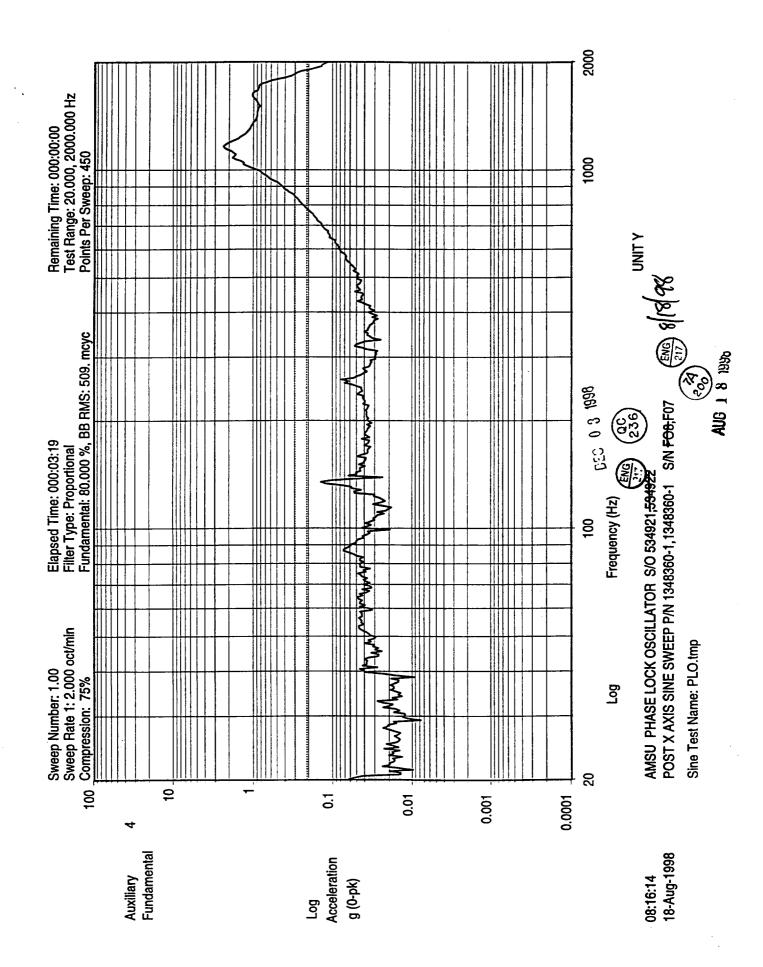


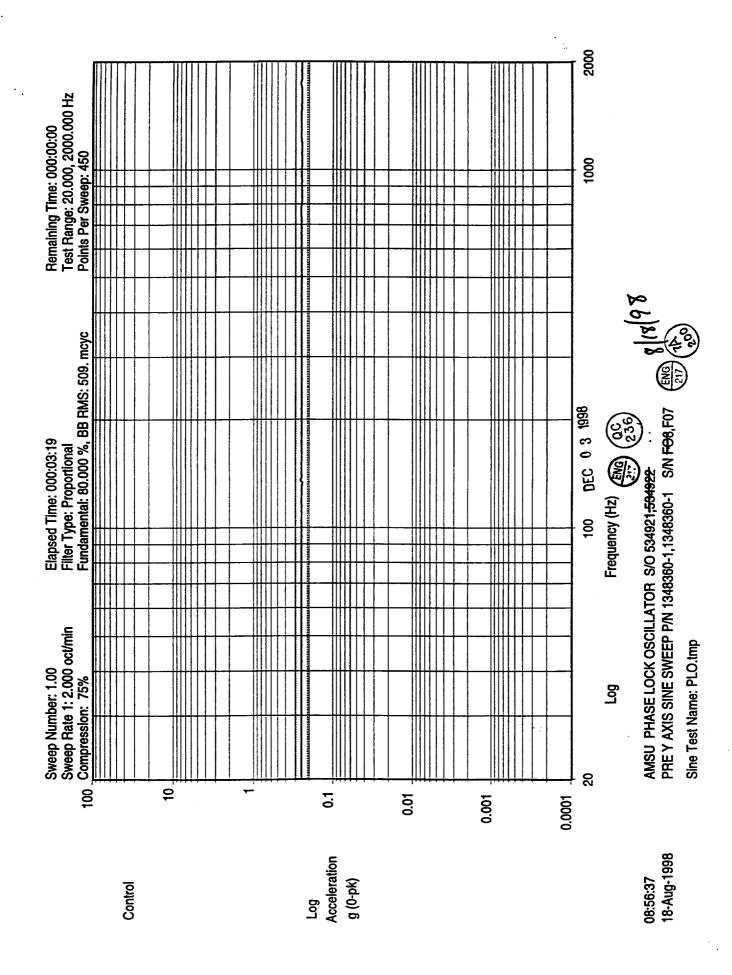


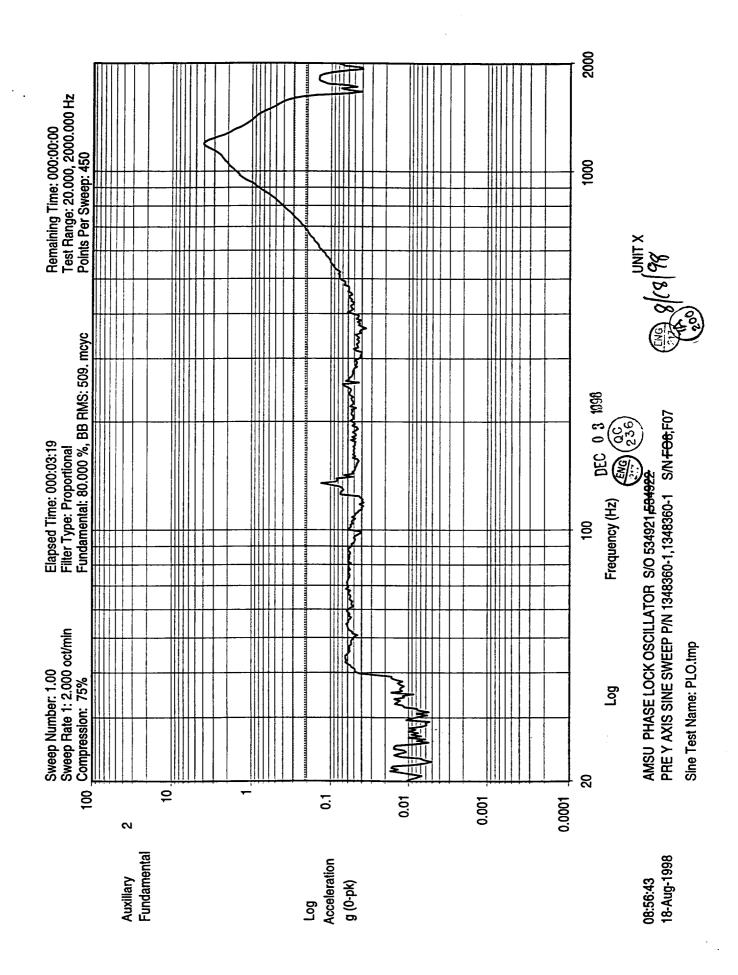


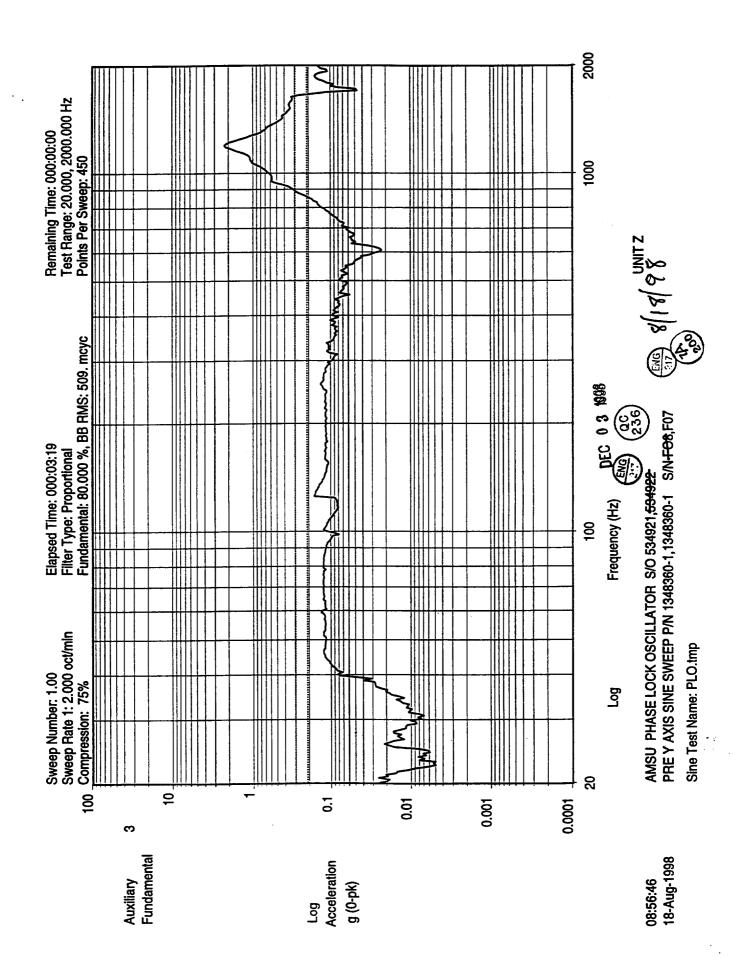


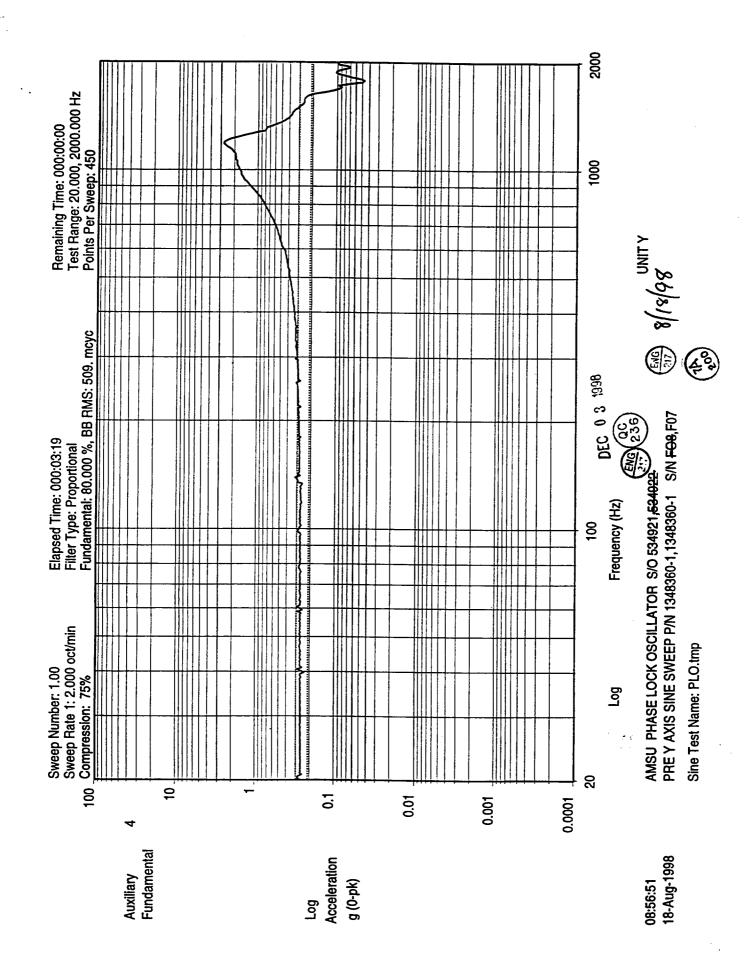


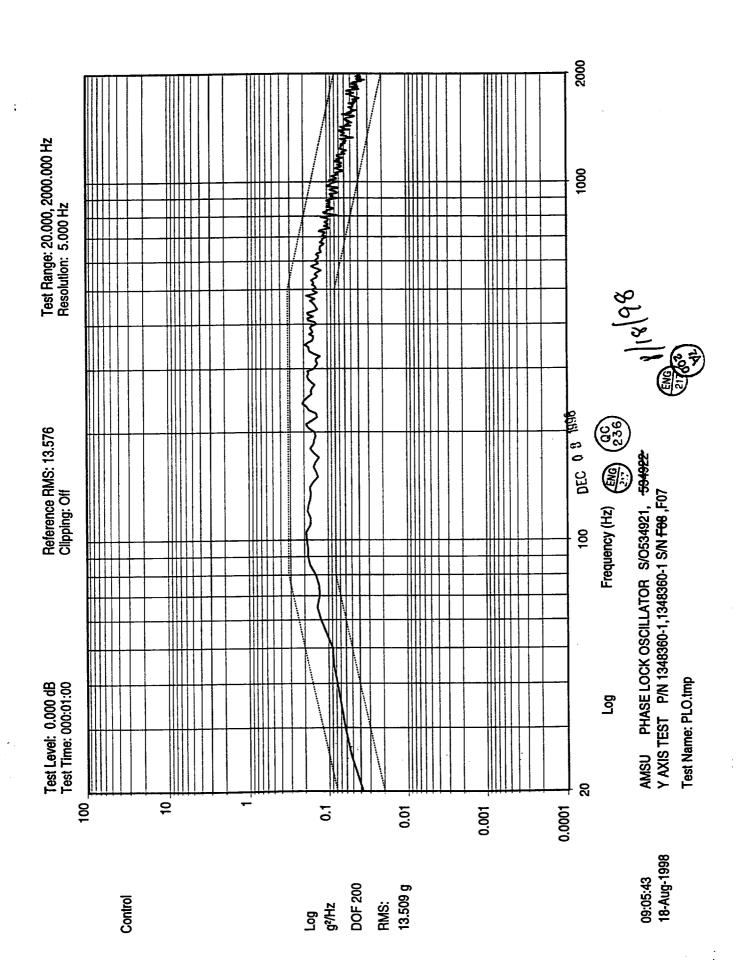












Section 2B: Acceptance Level Vibration - F08

This section includes the data from the limited functional tests which take place before and throughout vibration, and the vibration-specific. The following table summarizes the results of the limited functional test.

Test	Expected Value	Post X axis	Post Y axis	Post Z axis
Output Frequency	57290344 ± 200 kHz	57290318 kHz	57290318 kHz	57290317 kHz
Output Power	18.5 dBm ± 1.5 dB	19.1	19.1	17.0*

^{*} This measurement is out-of-family. Measurements taken in later tests show expected power levels.

The following pages contain the raw data.

TEST DATA SHEET 8B

		Limited Functional Test (Paragra	ph 4.2.3)		
		Post X-Axis LPT			
Test Se	etup Verified: Signature	bel		· Salah	
Paragr	raph 4.2.3.2:				
Step		Test	Required	Measurement	Pass/Fail
3	Potential Difference				
	From	То			
	Power Supply RTN	Test Platform *	< 1.0 Vac	NA	N/A
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	0.02 Vae	Pass
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	0.03 Vac	Pacc
Step	Test	Expected	Mea	sured	Pass/Fail
8	Voltage Meter 1	+15 ± 0.1 V	+15	. <u>O</u> _V	Pass
_	Voltage Meter 2	-15 ± 0.1 V	<u> </u>	<u>o_</u> v	Pass
	Current Meter 1	600 mA max.	542	mA	Pass
	Current Meter 2	100 mA max.	65.8	<u>₹</u> mA	Pass
9	Output Frequency	57.290344 ± .0001 GHz	57.2903	18 GHz	Pass
10	Output Power	18.5 dBm ±1.5 dB	1910		PASS
If used xis, che	d. N/A this line entry if not used each potential difference between	d in test. Example: If PLO is to b shaker table and power supply R	e vibrated and un	it tested "in-place"	after each
Operation	rder No.: 534922 on: 0150 STEP 6 rial No.: FOS	Test Engine Quality Cor	atrol Step	La N. Don	Ajsk
Pate:	Aug 18, 1998				

TEST DATA SHEET 8C Limited Functional Test (Paragraph 4.2.3)

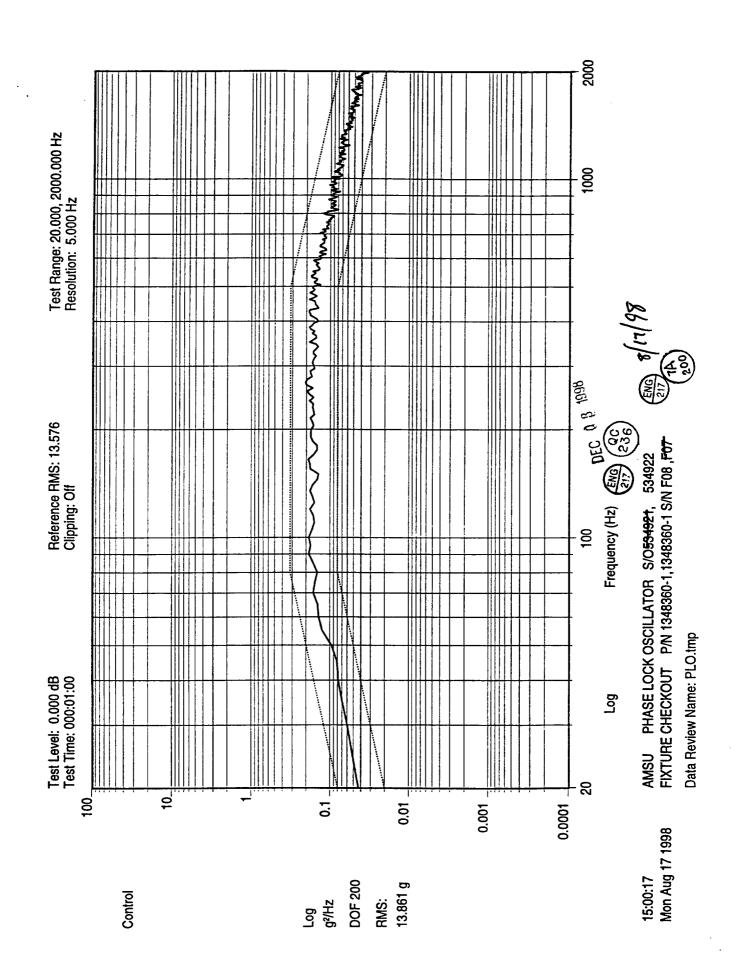
		Post Y-Axis LPT			
	and Alas	7010			
est Se	tup Verified: Signatu	re			
	•				
Paragra	aph 4.2.3.2:				
Step		Test	Required	Measurement	Pass/Fa
3	Potential Difference				
	From	То			
	Power Supply RTN	Test Platform *	< 1.0 Vac	N/A	NA
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	0.04 VAC	Pass
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	0.03 VAE	Pass
					D/T-
Step	Test	Expected		sured	Pass/Fa
8	Voltage Meter 1	+15 ± 0.1 V	+ 15		PASS
	Voltage Meter 2	-15 ± 0.1 V		: <u>0</u> v	PASS
	Current Meter 1	600 mA max.	541.5		PASS
	Current Meter 2	100 mA max.	<u>65,8</u>		PASS
9	Output Frequency	57.290344 ± .0001 GHz	57,2903	18 GHZ '	PASS
10	Output Power	18.5 dBm ±1.5 dB	19.1	bBm	PASS
is, che	ck potential difference betwe	sed in test. Example: If PLO is to be en shaker table and power supply R	TN.		
peratio	rder No.: <u>53492</u> on: <u>0150</u> \$7	Test Engine Quality Cor	ntro Stalls	A Sevales	200
nit Sei Date:			1.46		

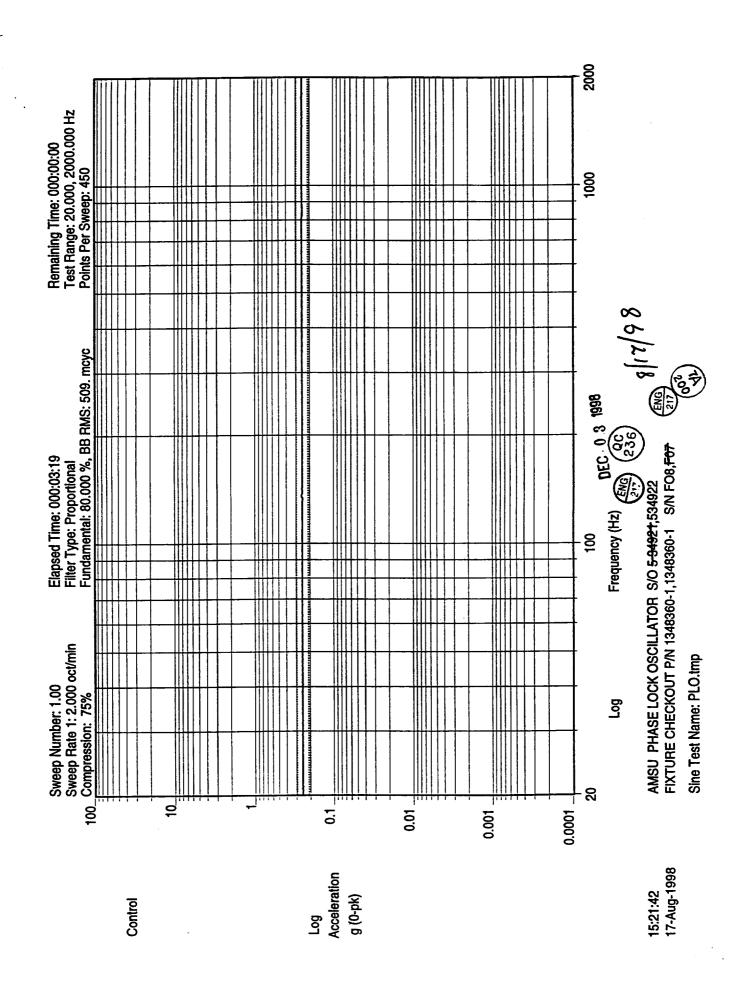
Test Setup Verified:

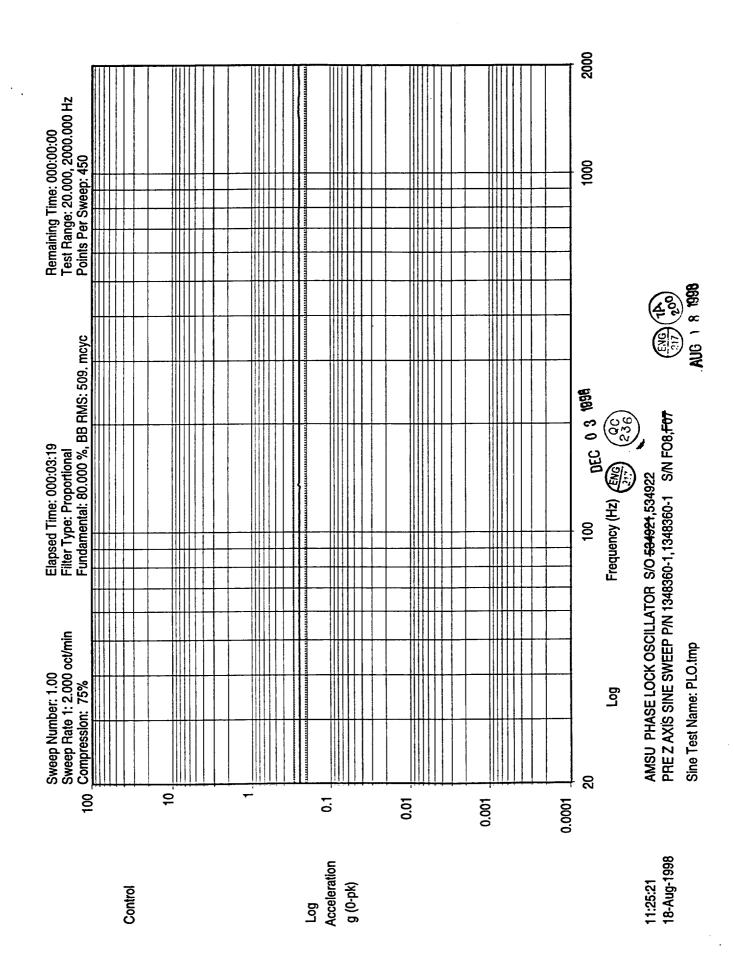
TEST DATA SHEET 8D Limited Functional Test (Paragraph 4.2.3)

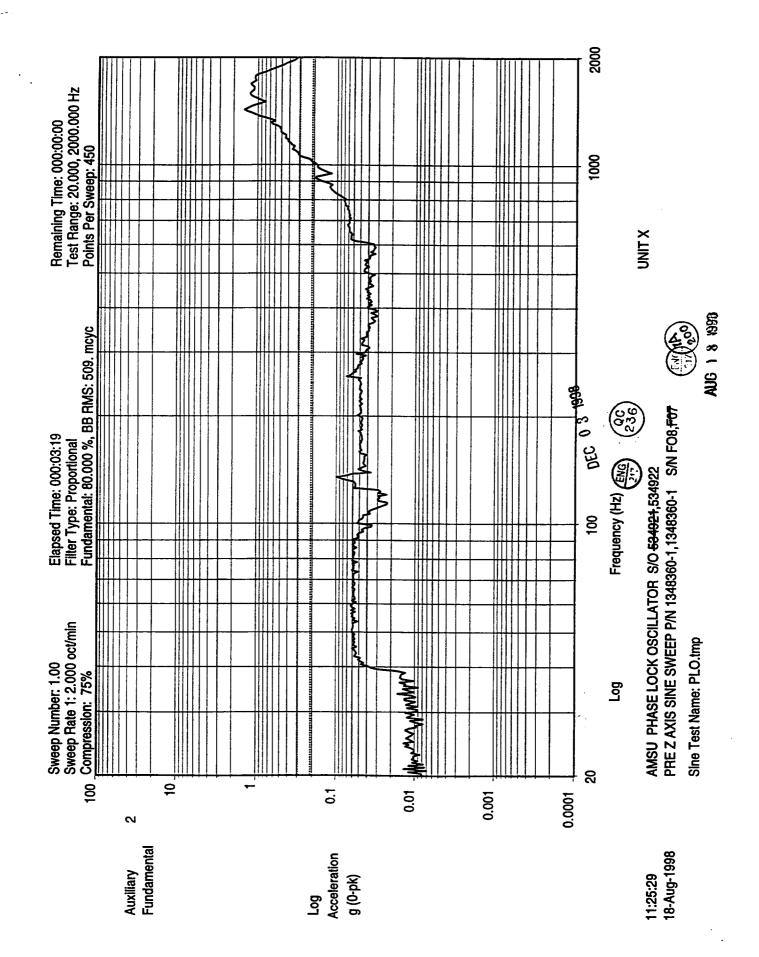
Post Z-Axis LPT

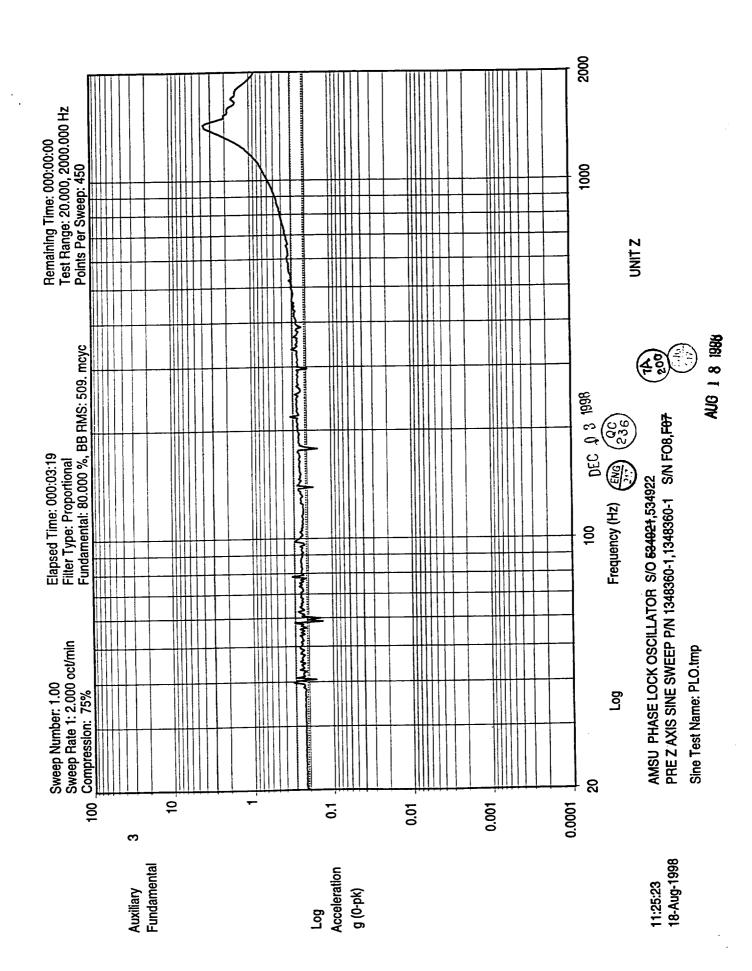
Step		Test	Required	Measurement	Pass/Fail
3	Potential Difference				
	From	То			
	Power Supply RTN	Test Platform *	< 1.0 Vac	N/A	N/A
	Power Supply RTN	Frequency Counter Chassis	< 1.0 Vac	0.05 Vac	PASS
	Power Supply RTN	Power Meter Chassis	< 1.0 Vac	0.03 Vae	PASS
Step	Test	Expected	Mea	sured	Pass/Fail
8	Voltage Meter 1	+15 ± 0.1 V	+ 75	5. 0 _V	PASS
	Voltage Meter 2 ~	-15 ± 0.1 V		5.0 V	PASS
	Current Meter 1	600 mA max.	541.4	<u>1</u> mA	PASS
	Current Meter 2	100 mA max.	65.8	mA	PASS
9	Output Frequency	57.290344 ± .0001 GHz	57.29031	7 GH2	PMSS
10	Output Power	18.5 dBm ±1.5 dB	17.02		PASS
		ed in test. Example: If PLO is to be no shaker table and power supply R		it tested "in-place"	' after each
				it tested "in-place"	after each

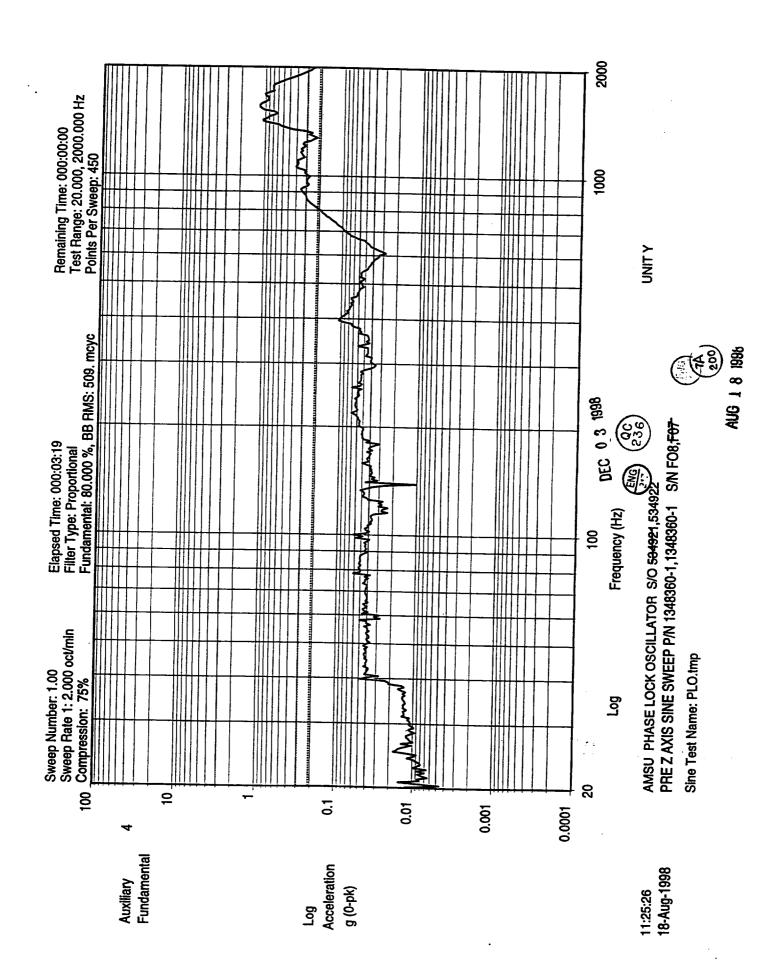


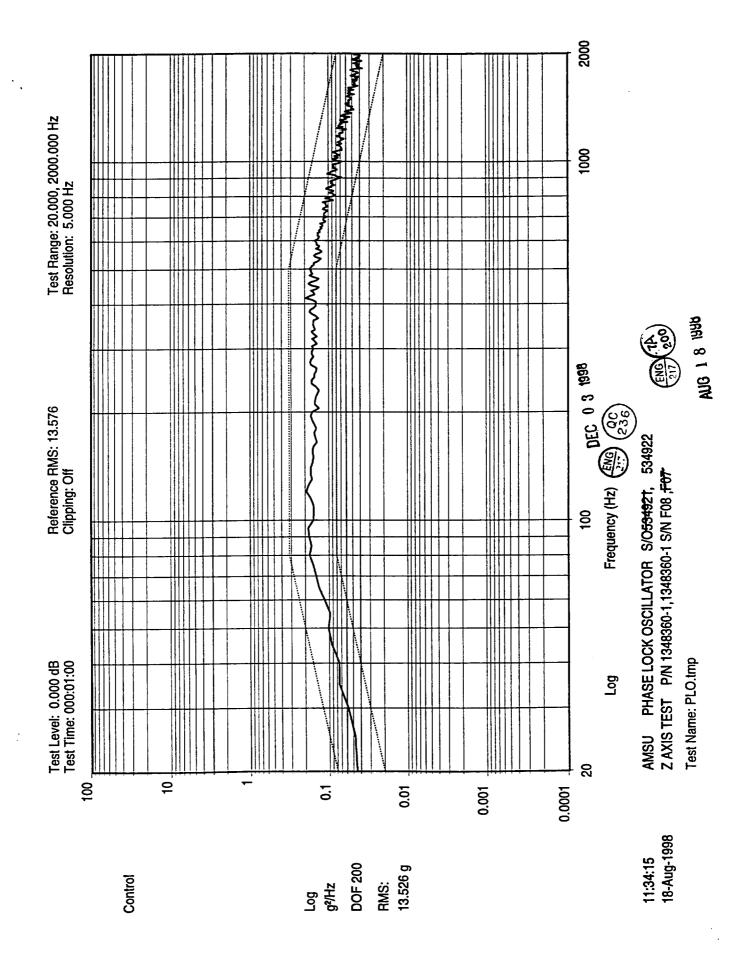


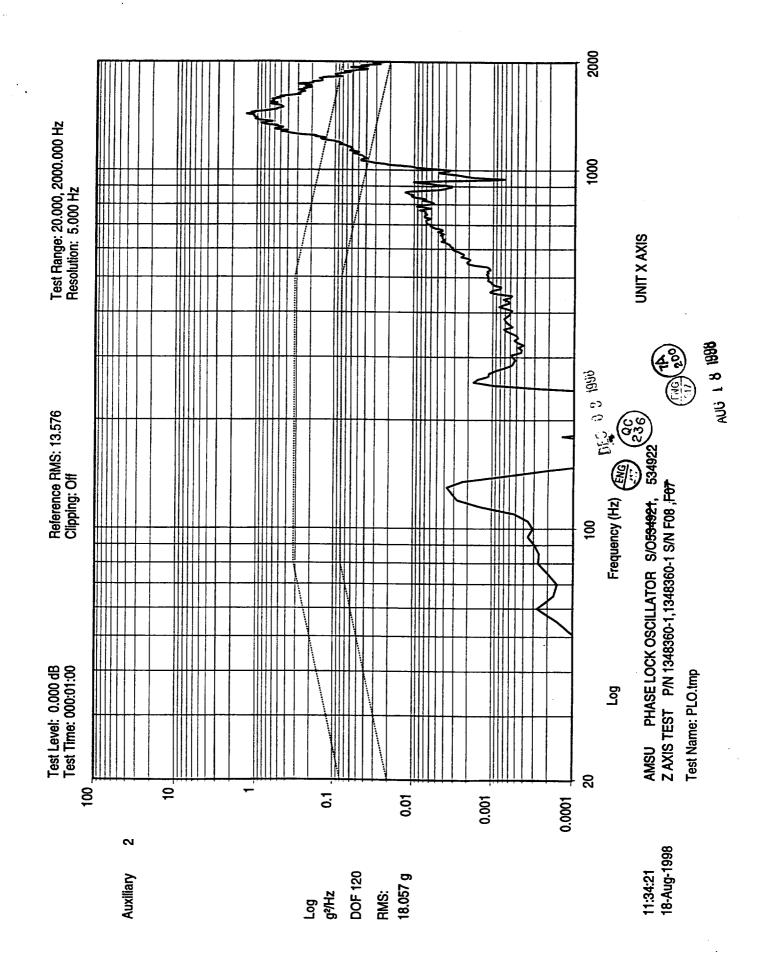


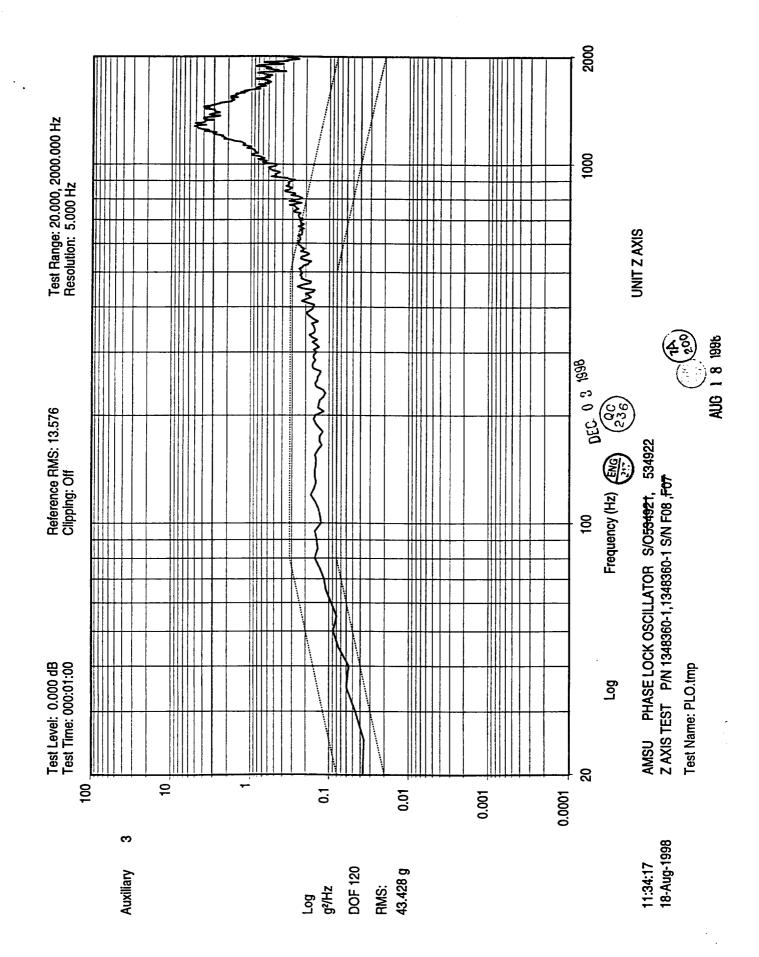


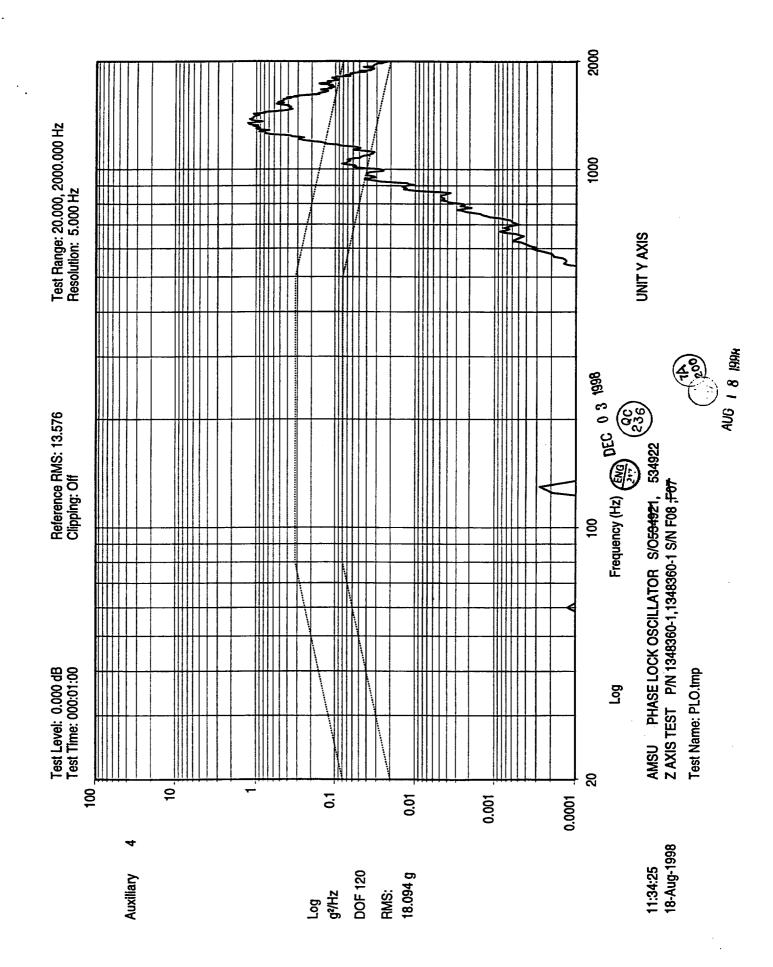


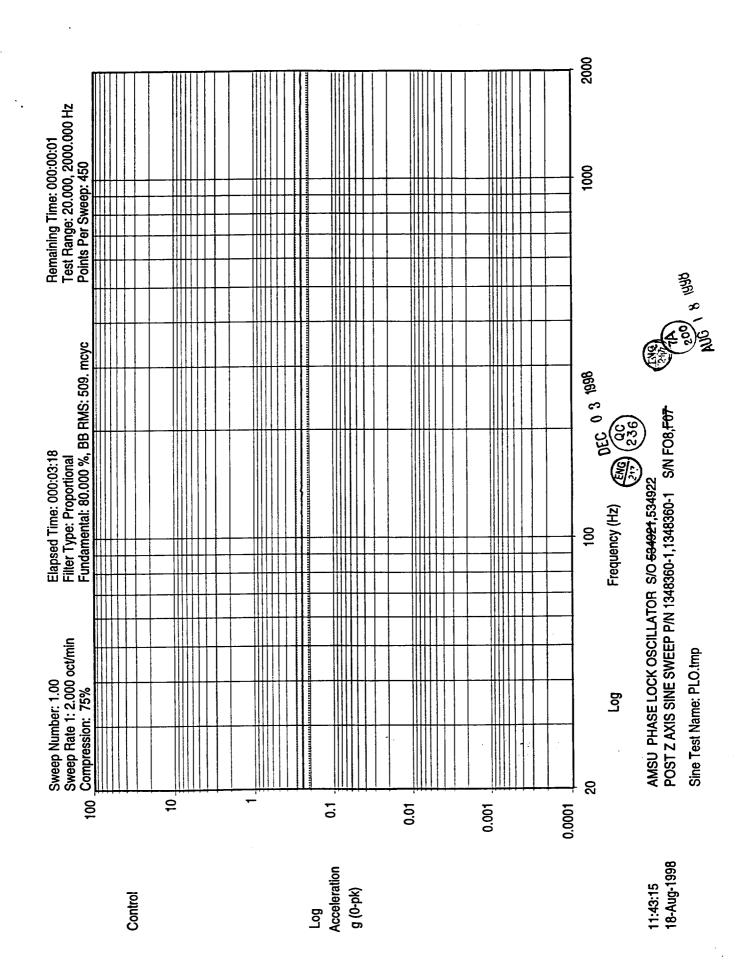


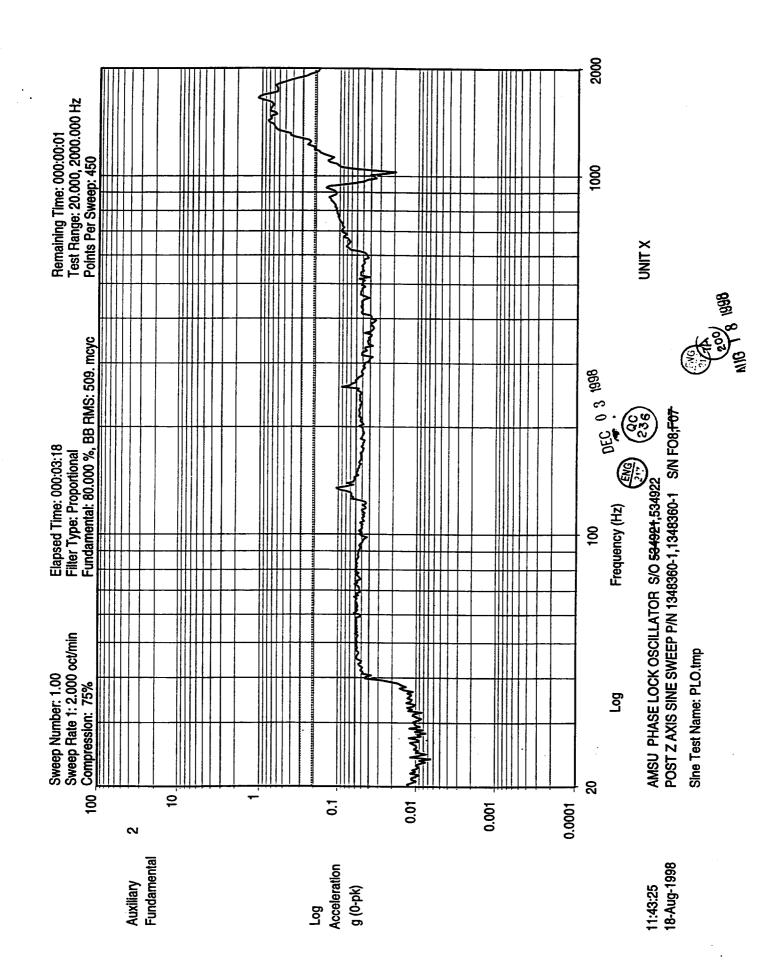


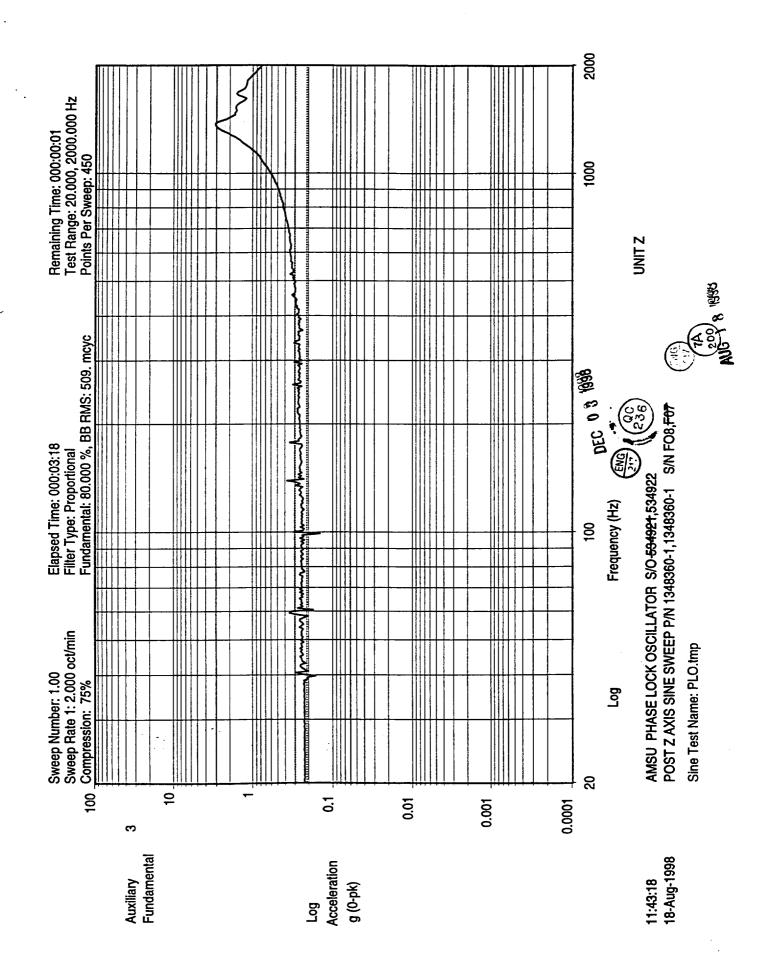


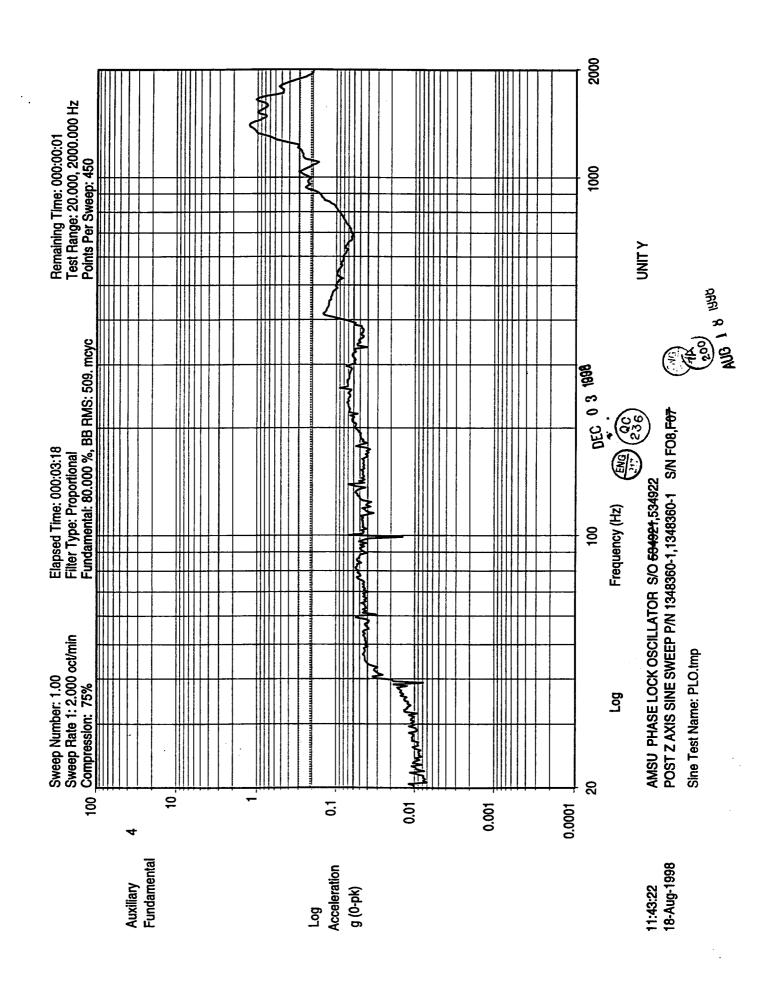


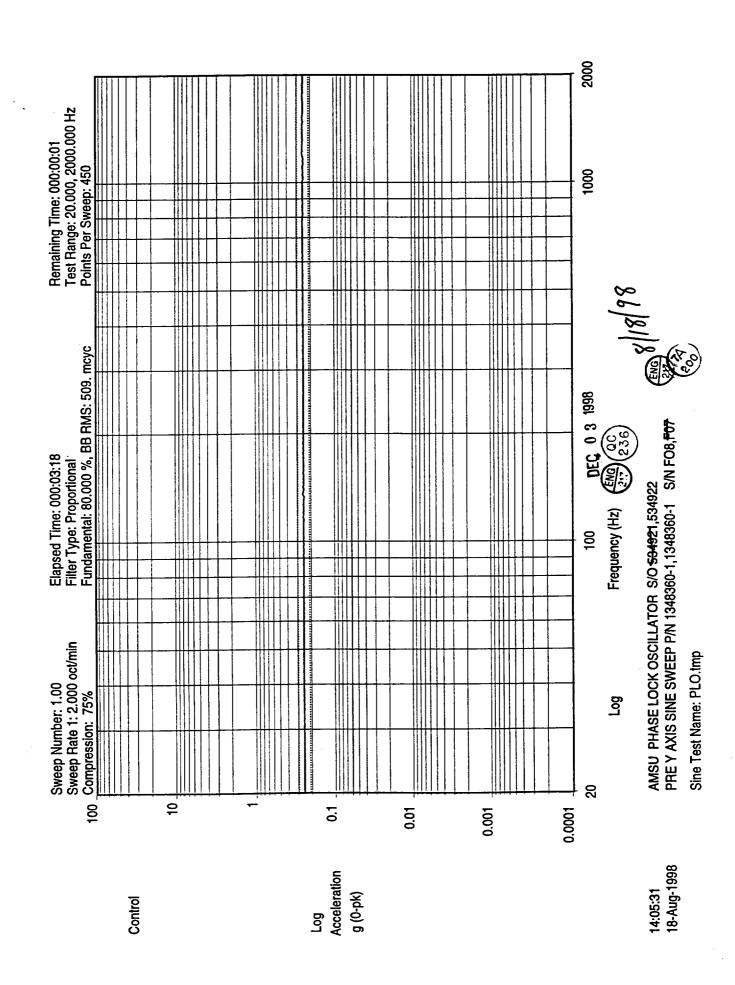


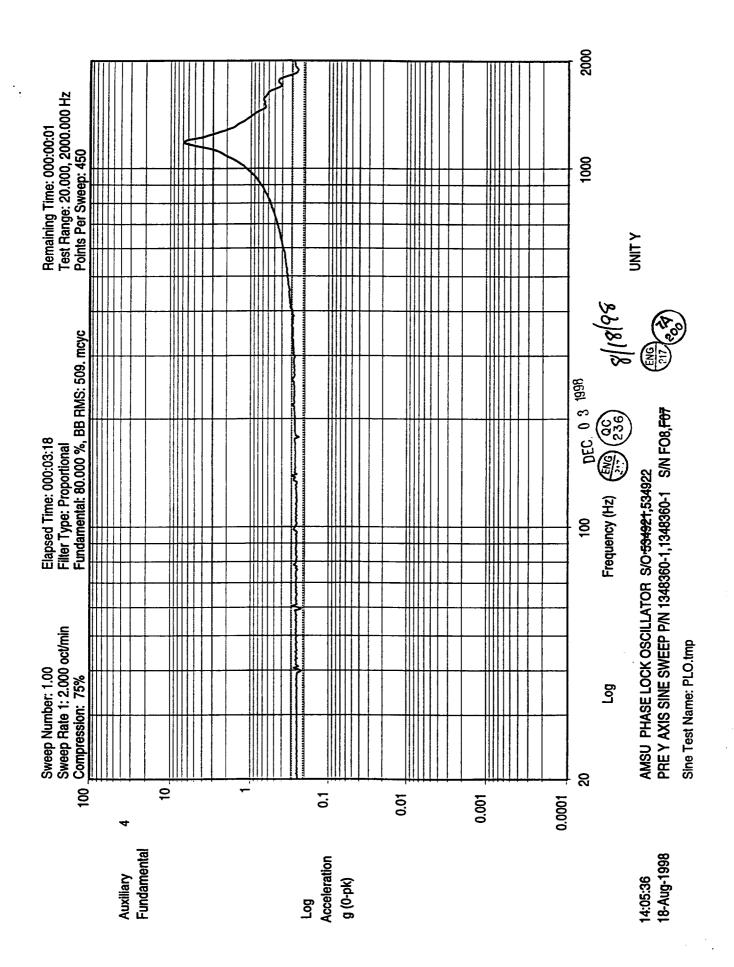


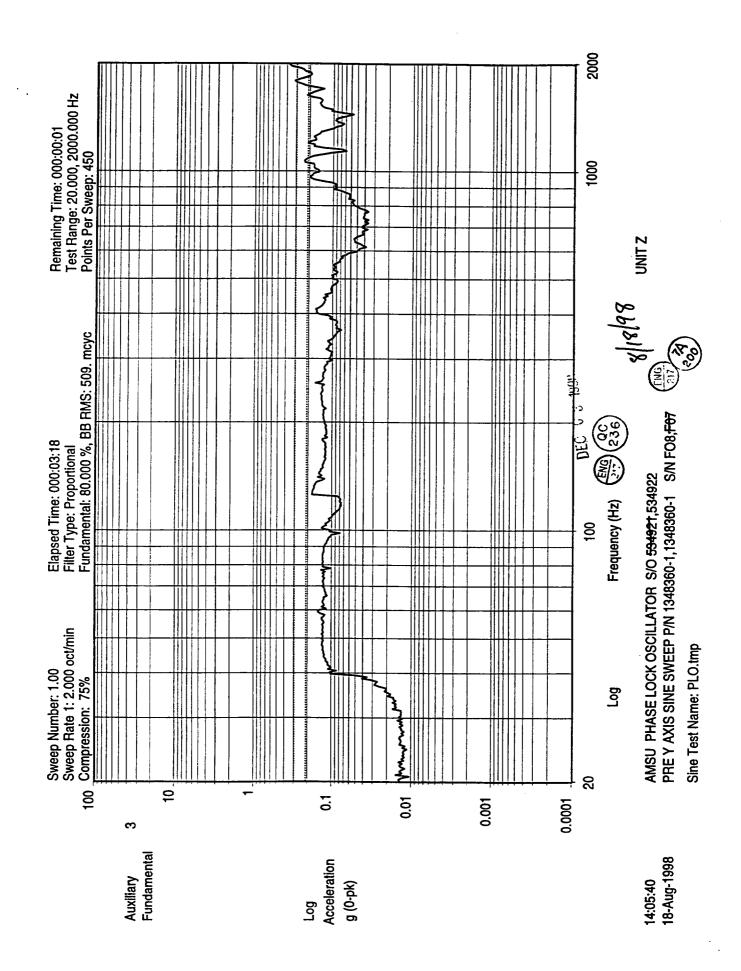


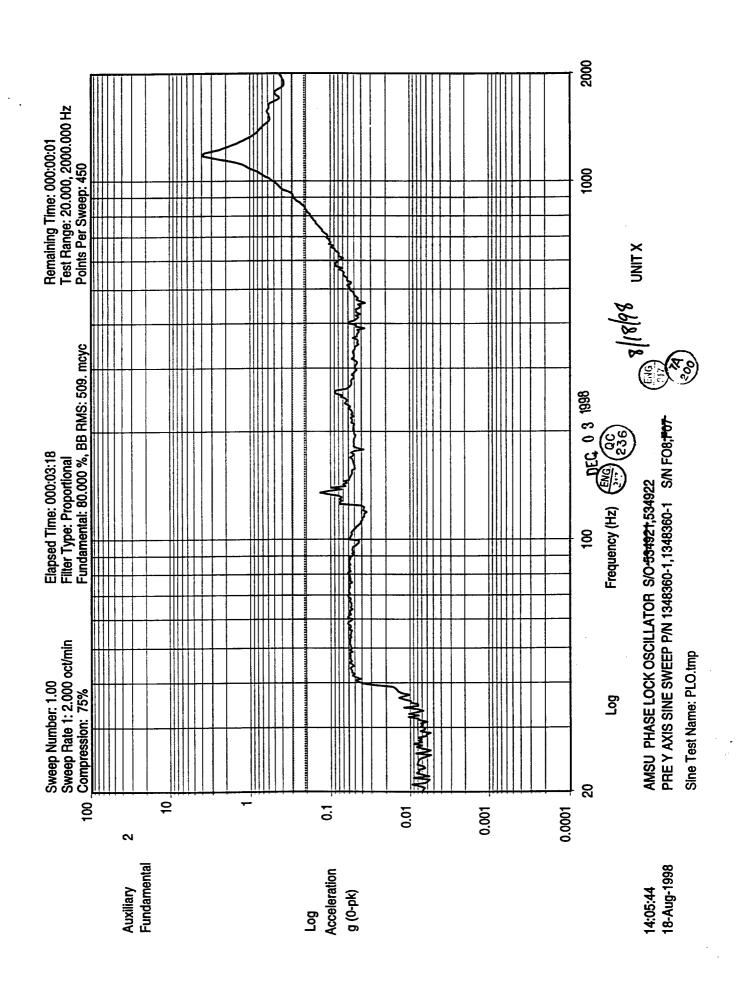




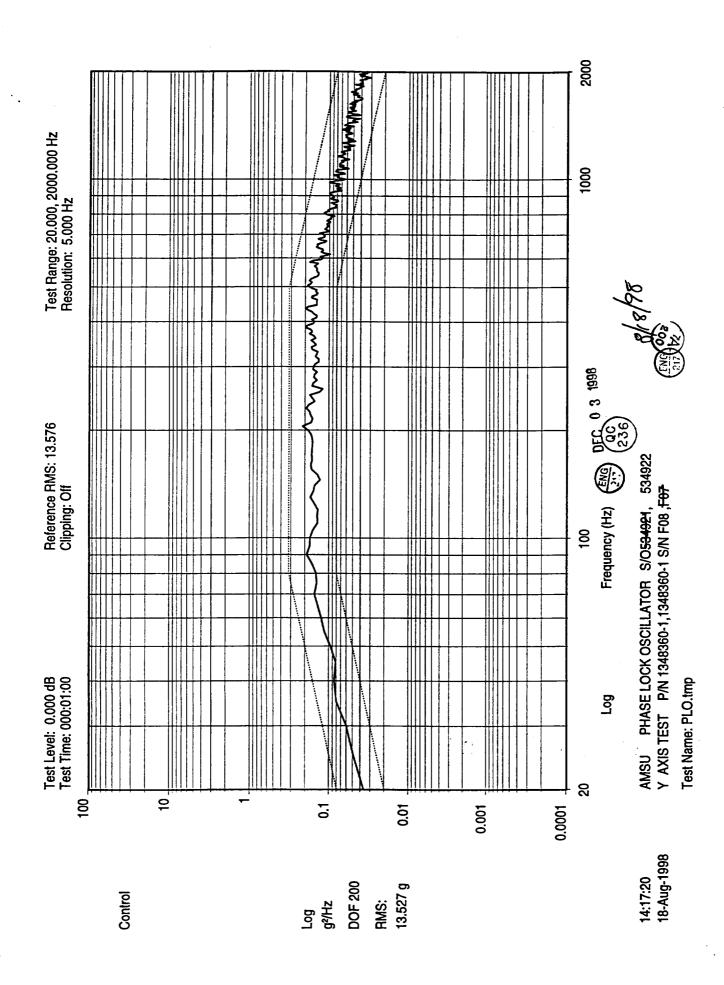


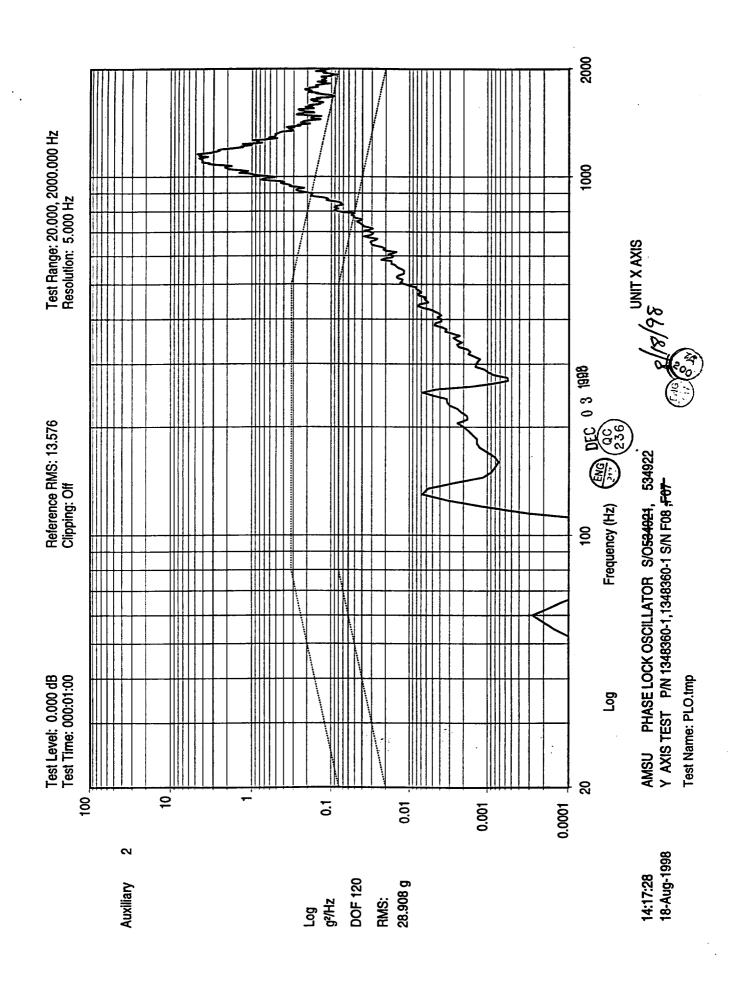


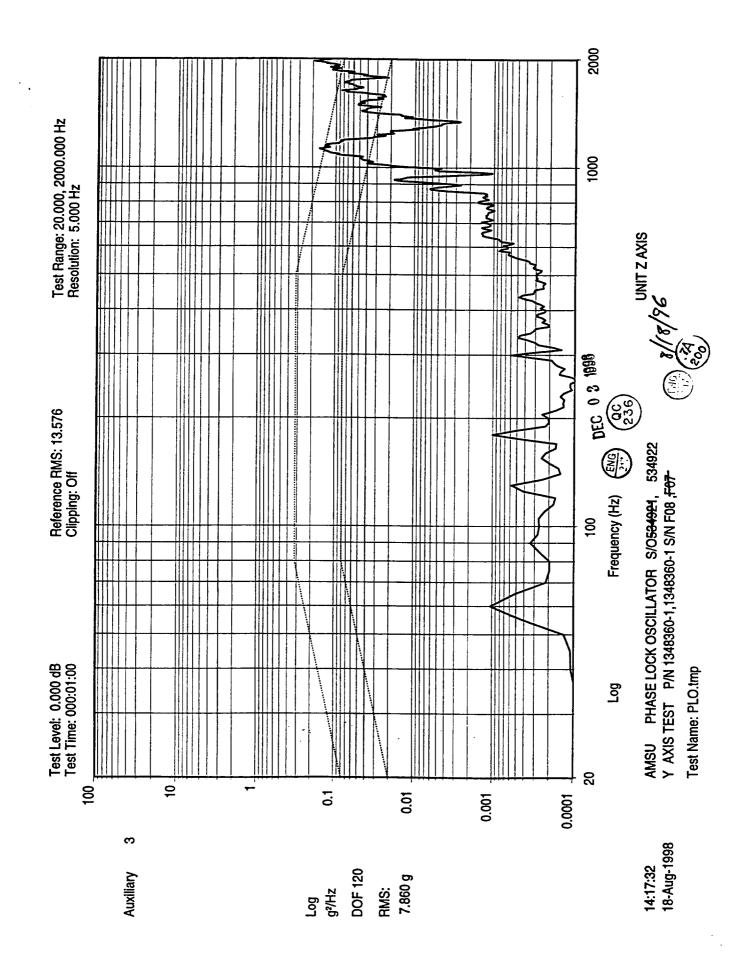


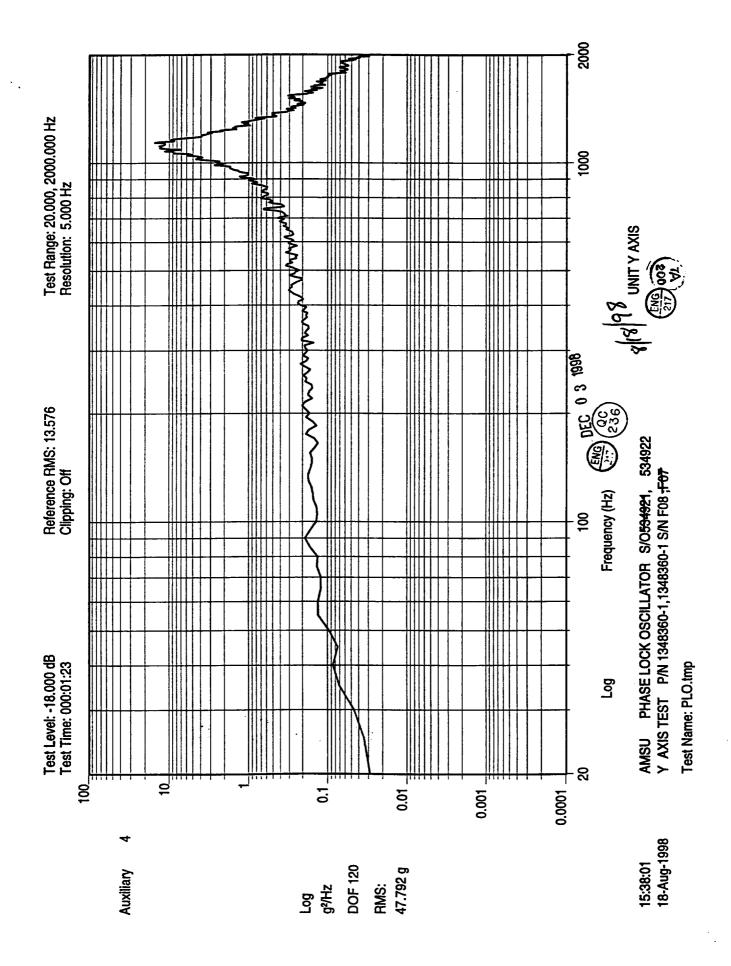


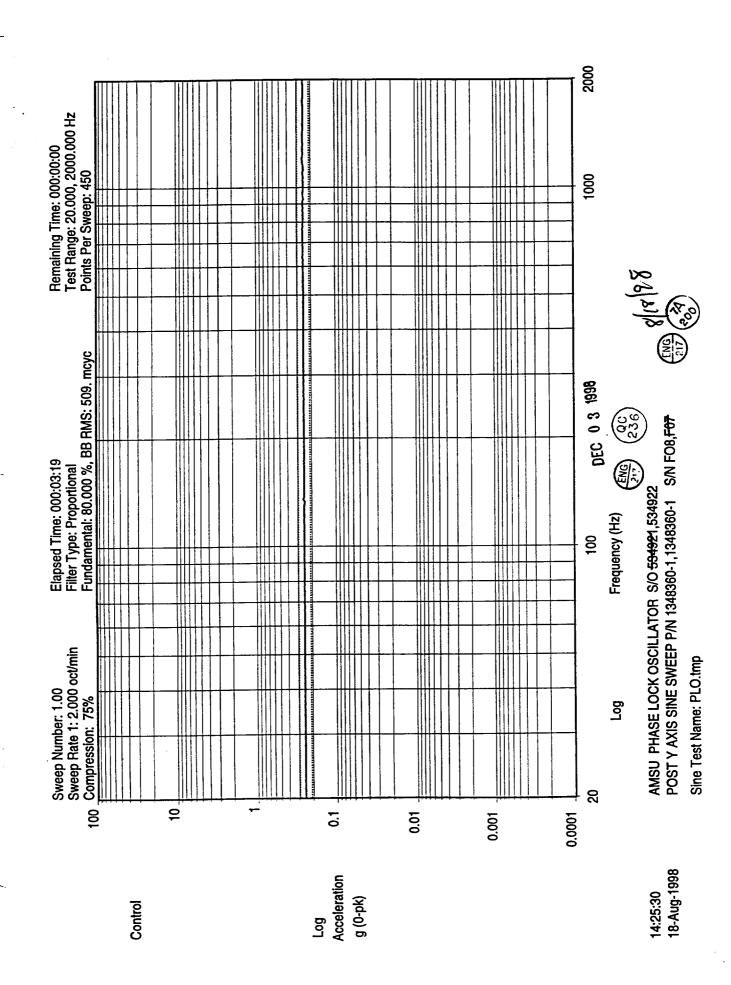
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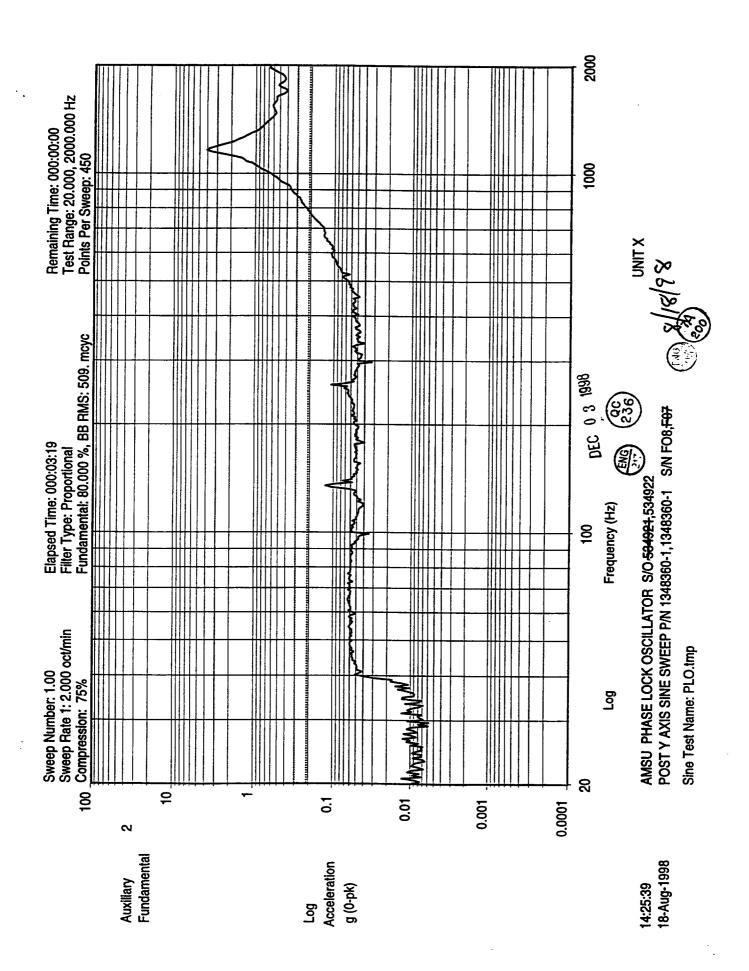


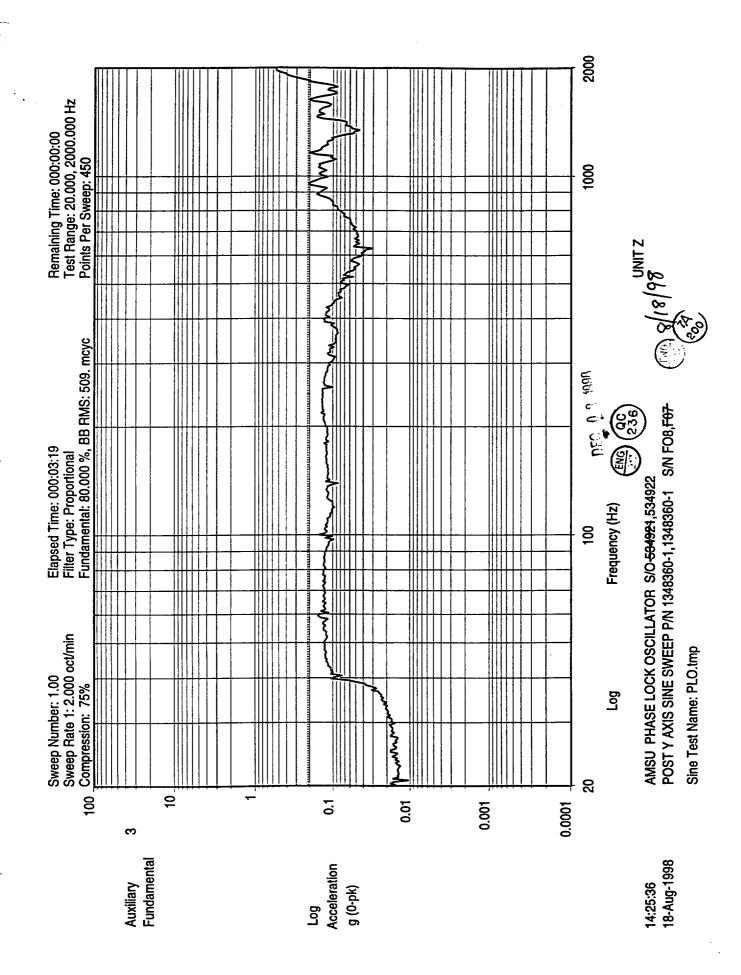


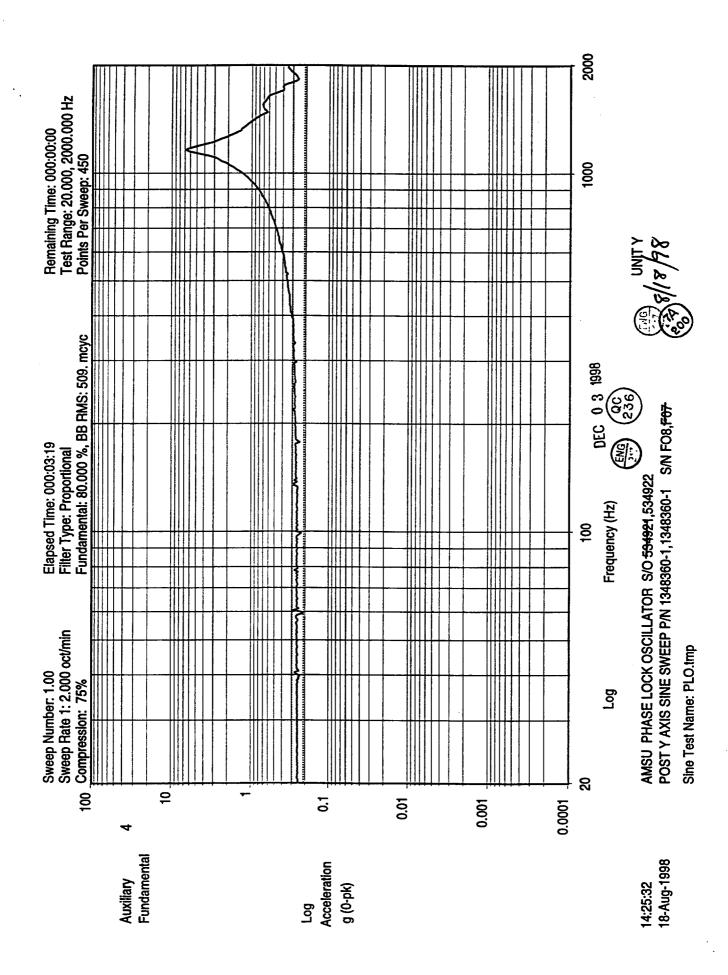


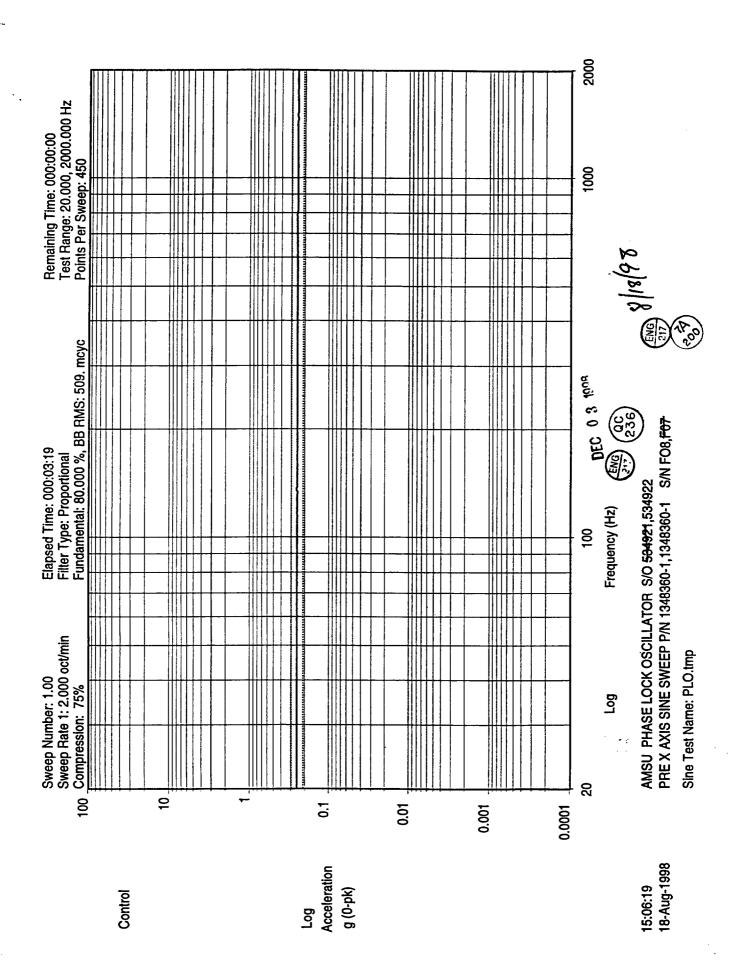


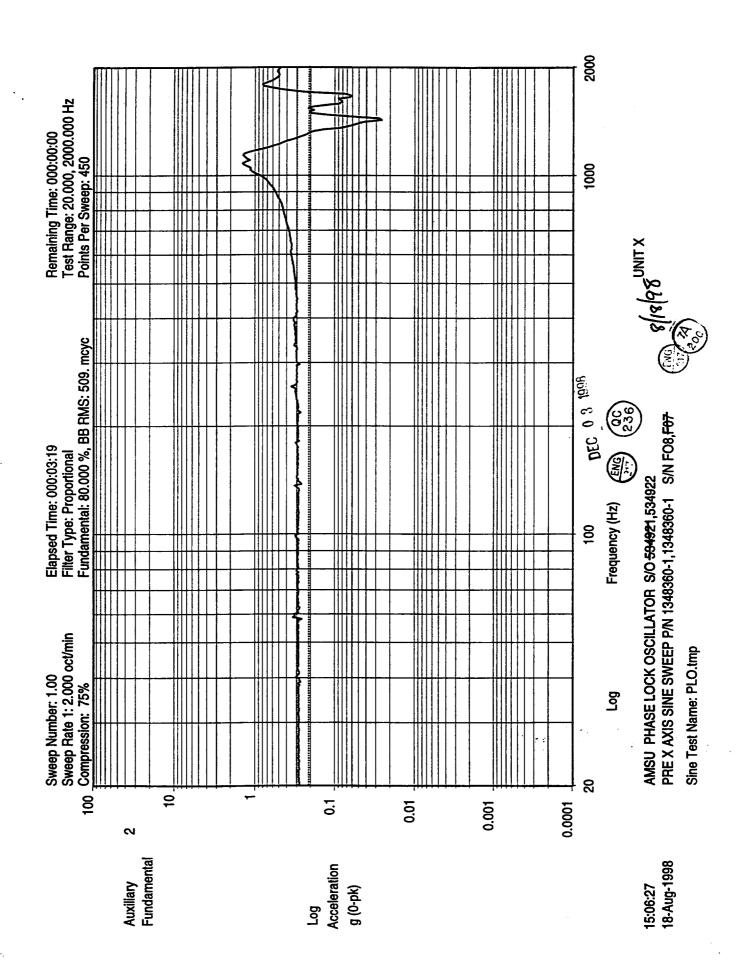


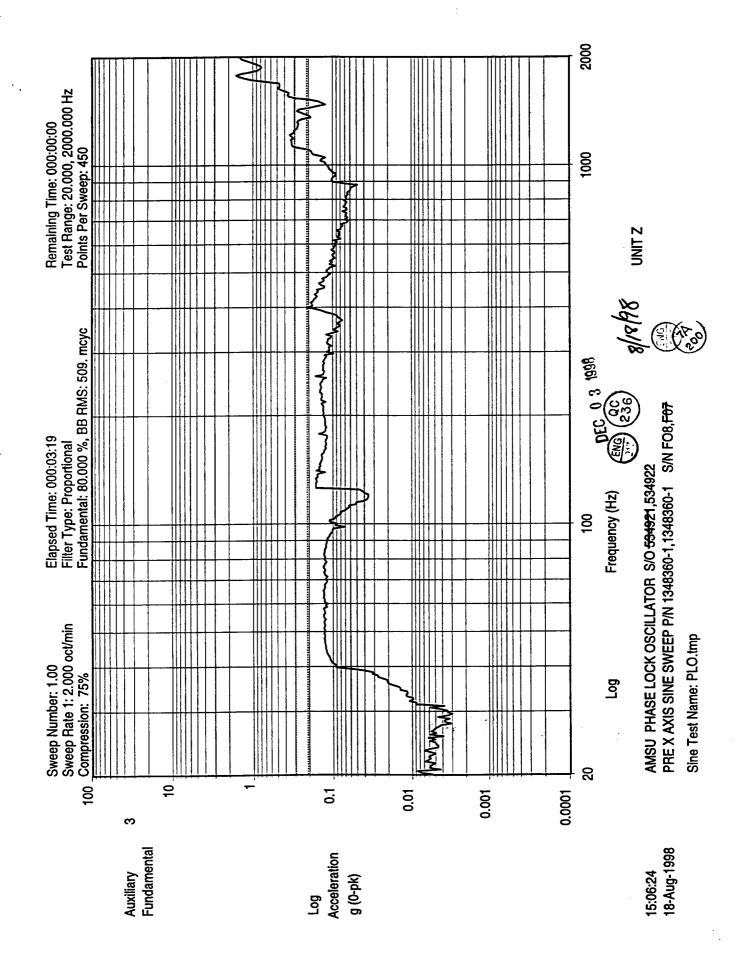


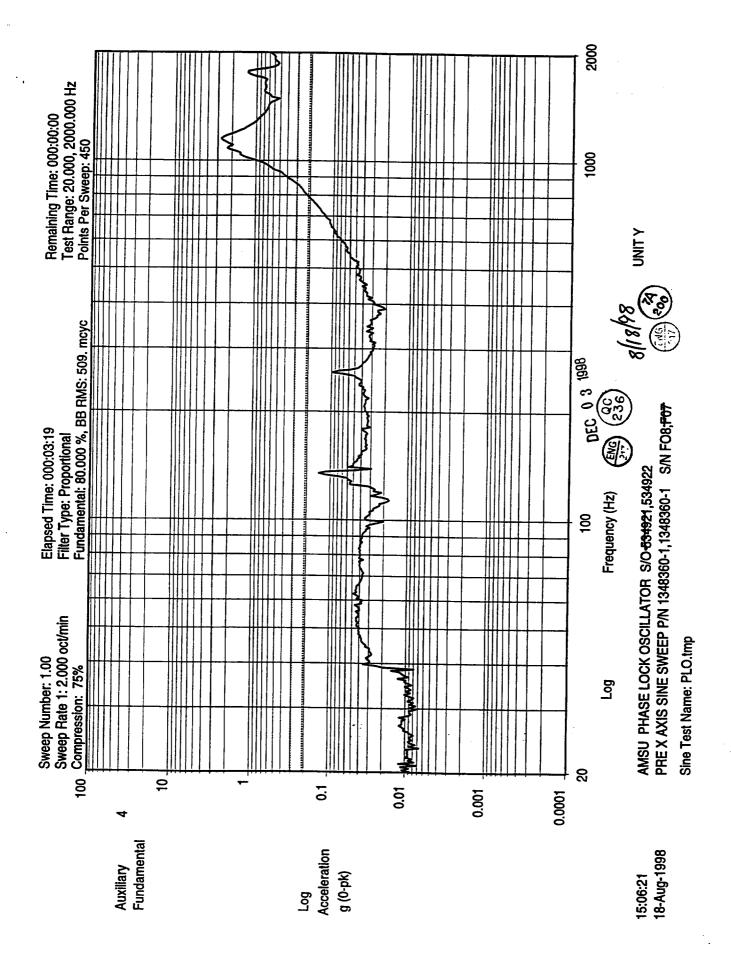


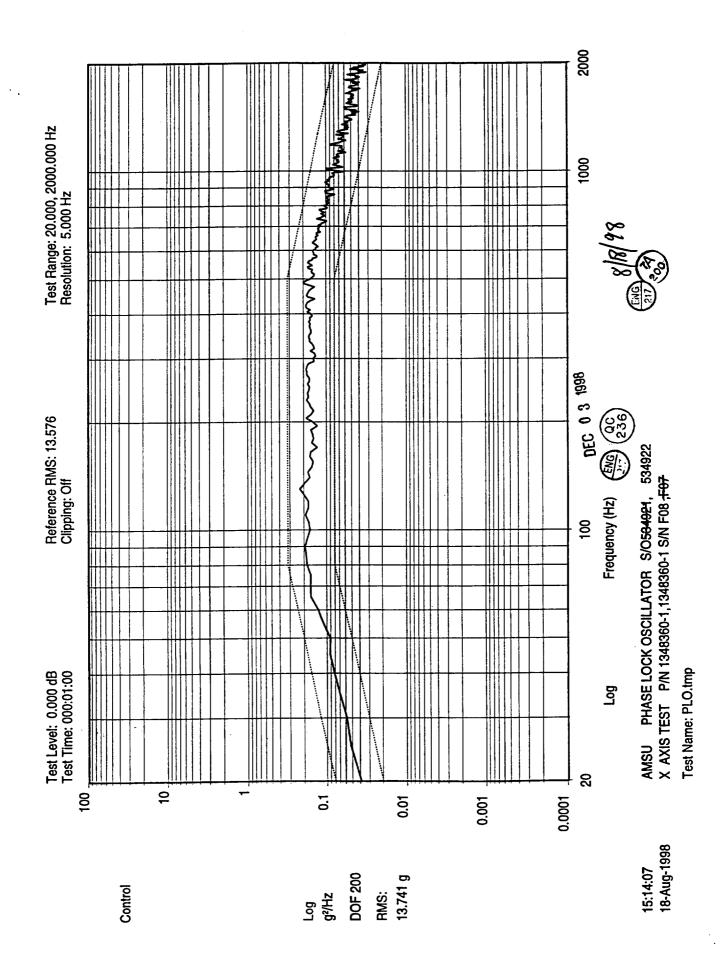


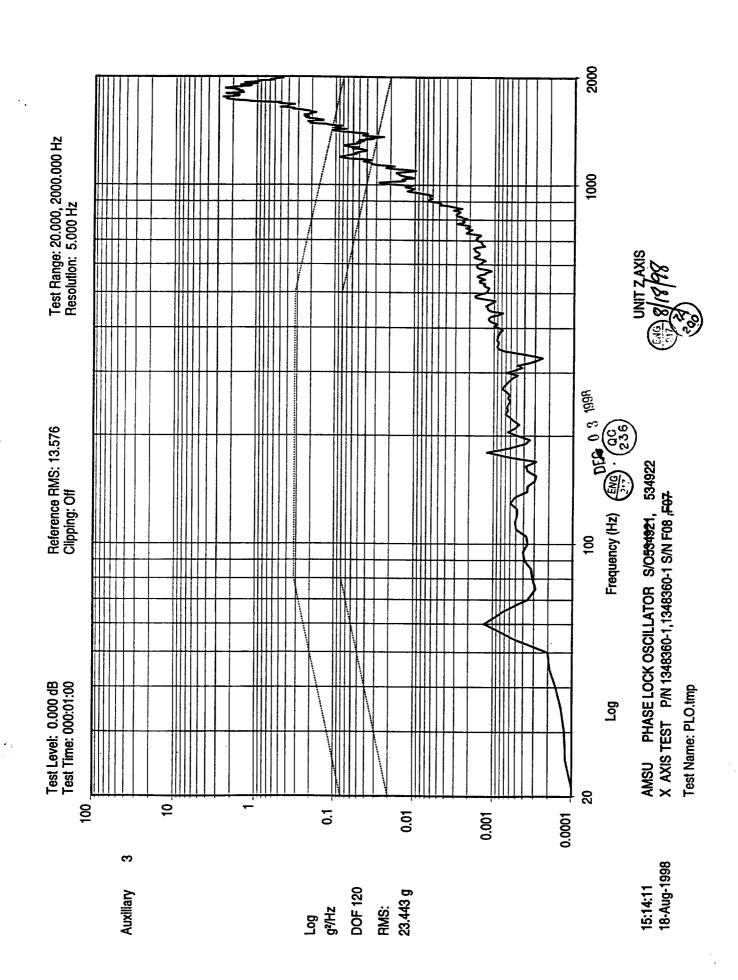


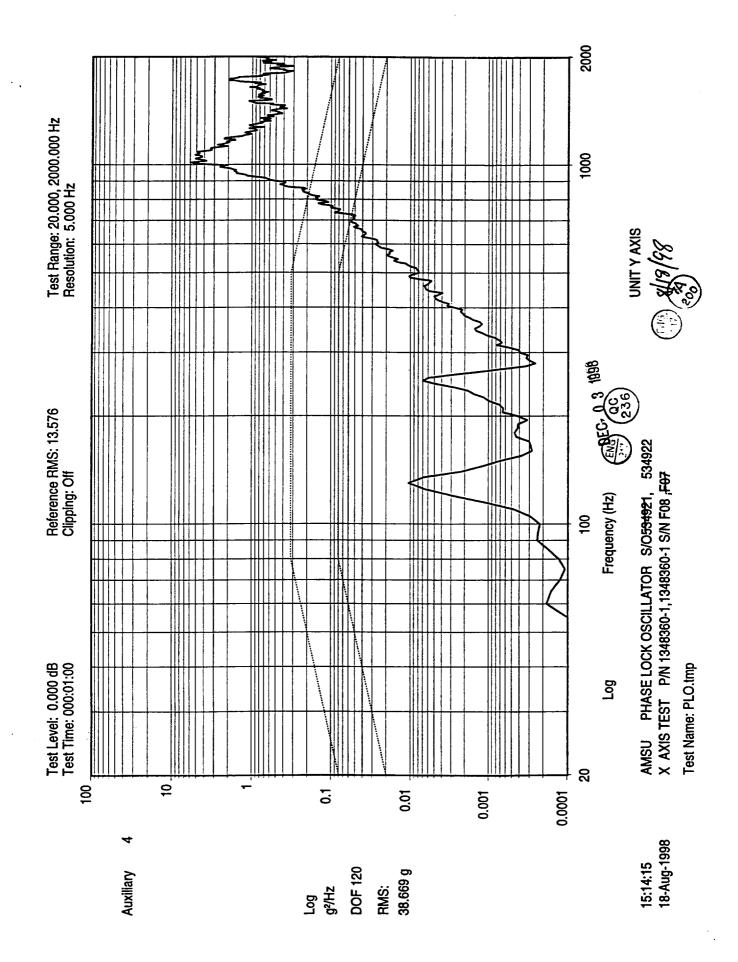


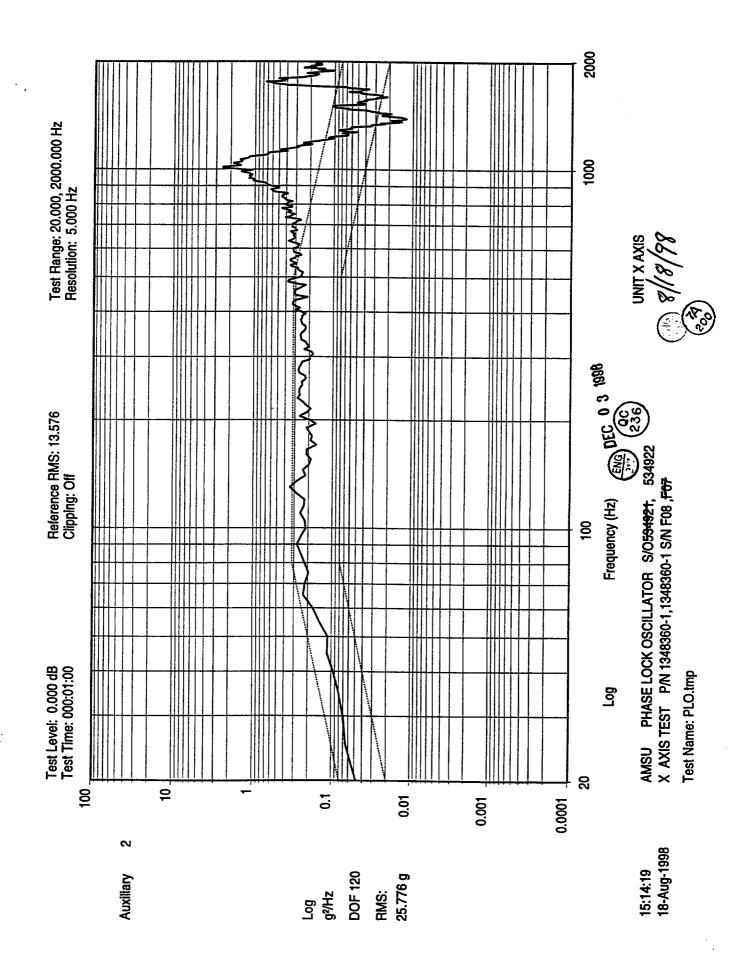


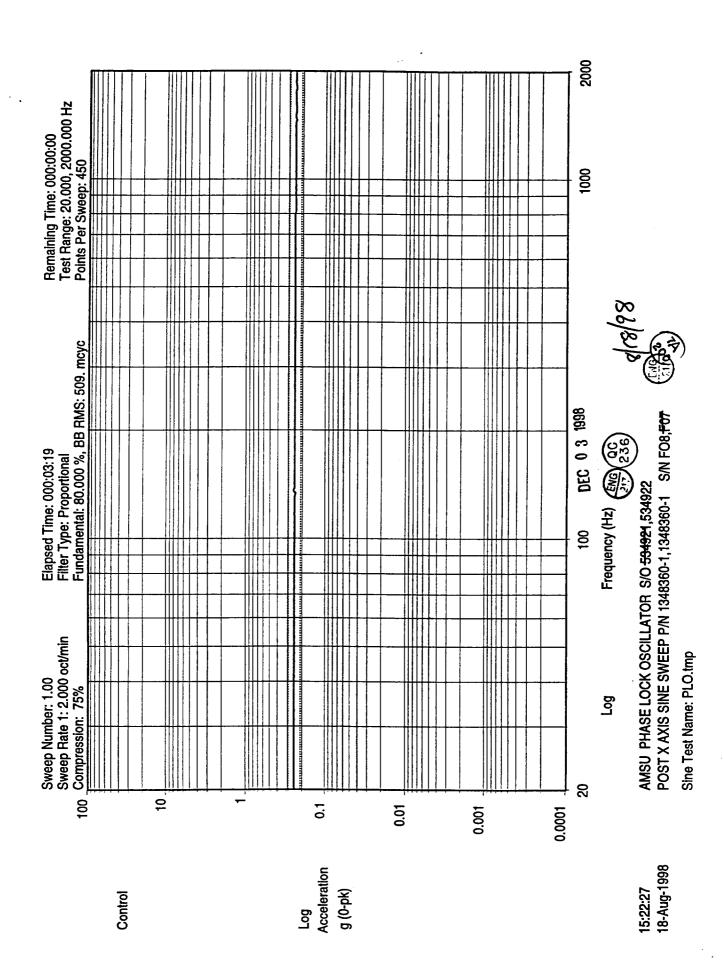


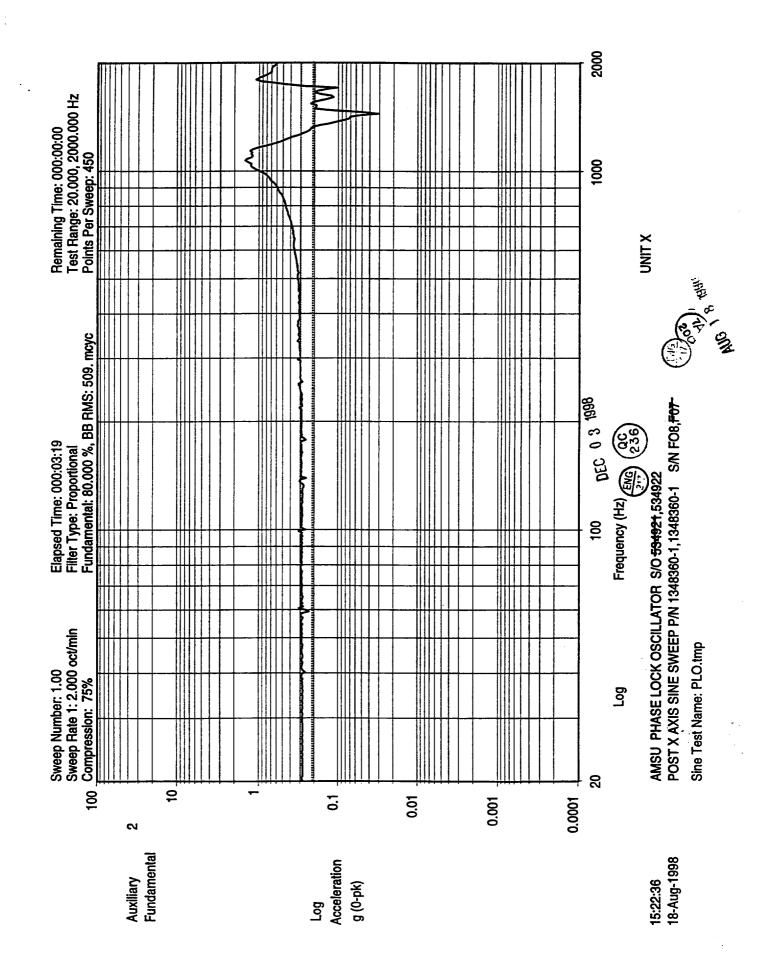


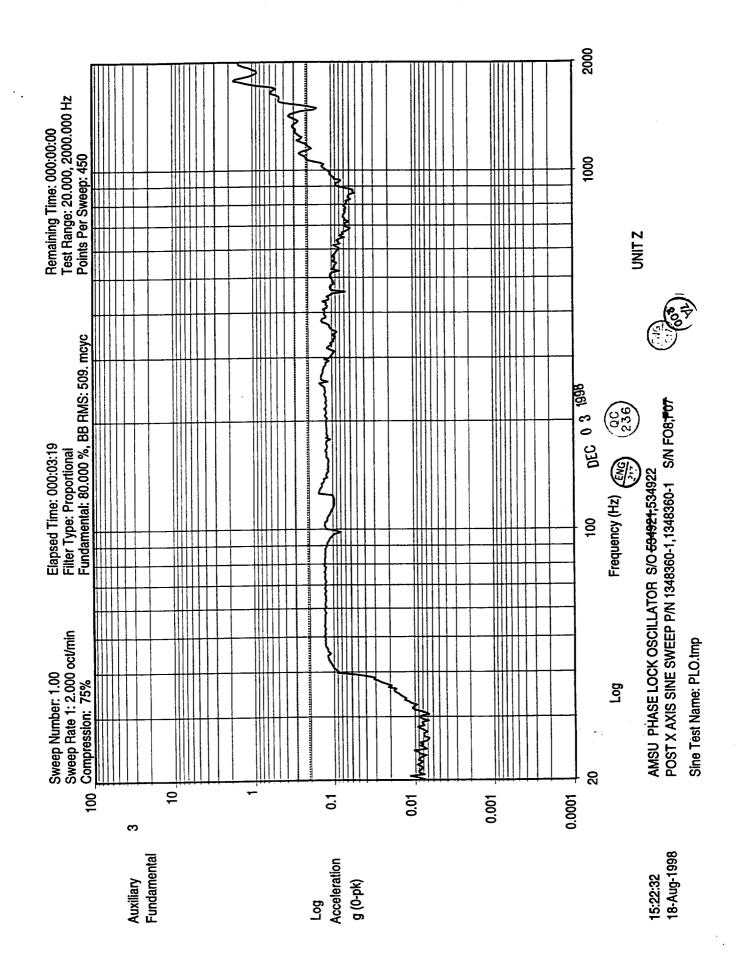


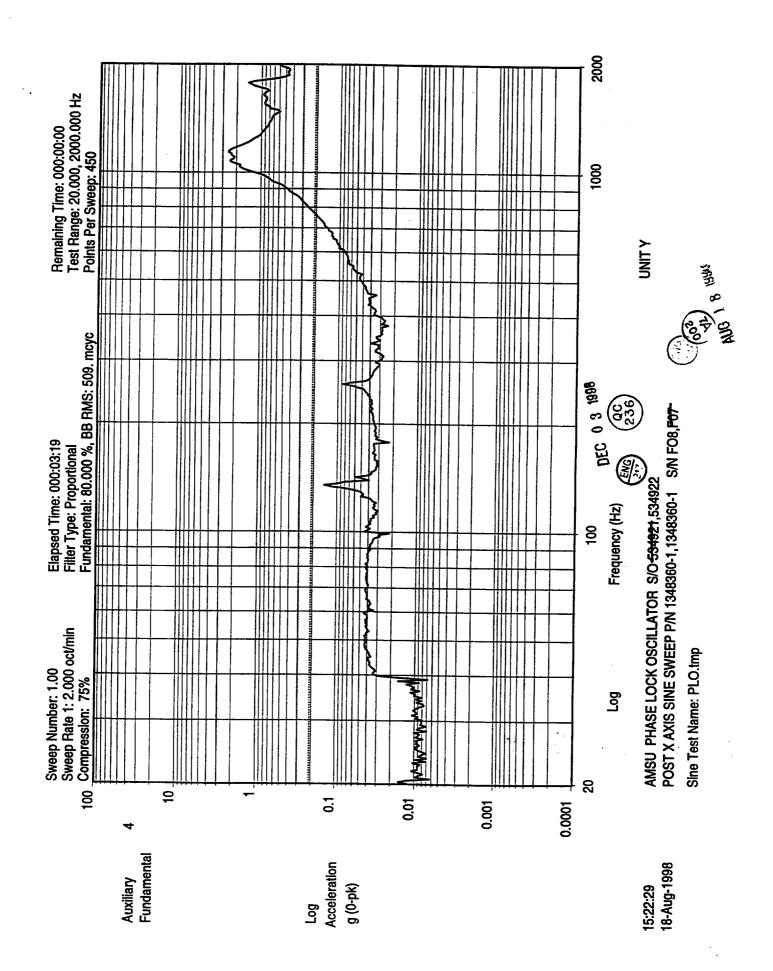












Section 3A: Frequency and Power Hysteresis - F07

Worst case frequency and power hysteresis at 22°C for S/N F07 are 2 kHz and approximately 0.7 dBm, respectively. The recorded value for Output Power after cycle 5 is determined to be erroneous data resultant from adding in a coupler loss of 1.2 twice. Without the loss added twice, the power after cycle 5 would be 19.3 dBm, which is very much in line with expectation.

TEST DATA SHEET 7 (Sheet 1 of 3) Temperature Cycling (Paragraph 4.2.2)

	Signature	· 				
Temperature Cycle	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6
Frequency 57.290344 GHz ±200 kHz				57.290324 GHZ	57.290323 GHZ	57.29632. GHZ
Output Power 17 to 20 dBm		NA		19.90dBm	20.51 19. dBM	19.3 don
Frequency 67.290344 GHz -200 kHz	(J)	1843 227)				
Output Power 7 to 20 dBm				·		

Shop Order No.:534921	Test Engineer: M.R. Upr proved.
Operation: 0170	Quanty condon.
Unit Serial No.: FØ7	Govt. Rep.: 2 -11-98
Date: 9-3-98	

Section 3B: Frequency and Power Hysteresis - F08

Worst case frequency and power hysteresis at 22°C for S/N F07 are 2 kHz and approximately 0.5 dBm, respectively.

TEST DATA SHEET 7 (Sheet 1 of 3) Temperature Cycling (Paragraph 4.2.2)

Test Setup Verified:_	Signature	· · · ·		· · · · · · · · · · · · · · · · · · ·		
Temperature Cycle	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6
Frequency 57.290344 GHz ±200 kHz	a. u. ururara			57.290331 GHZ	57,290332 GH3	57.29 <i>0333</i> GH2
Output Power 17 to 20 dBm		0		18.55dBm	dism	18.1 dsm
Frequency 57.290344 GHz ±200 kHz	gun	H 4/8/98 227)	9-3-98	•	
Output Power 17 to 20 dBm						•
Shop Order No.:	534922		Test Eng	ineer: Sun	luzur	9-2-98
Shop Order No.:	70		Test Eng Quality (Govt. Re	Control: (892)	Jugues 9	9-2-98 8

Section 4A: EMI/RE02 - F07

Not required. Qualification Testing done on S/N's F01, F02.

Section 4B: EMI/RE02 - F08

Not required. Qualification Testing done on S/N's F01, F02.

Section 5A: Final Functional Testing - F07

This section contains the results of a full functional test over temperature taken after PLO F07 endured thermal cycling. All tests passed.

TEST DATA SHEET 6C (Sheet 1 of 4) Functional Testing (Paragraph 4.2.1)

Post-Thermal Cycling CPT
9-8-98

Test Setup Verified: Signature

Paragraph 4.2.1.3, Functional Testing:

Step	ph 4.2.1.3, Functional Testing: Test	Expected	Measured	Pass/Fail
1	Potential Difference from ± 15	V RTN to:		
	PLO Base Plate	< 1.0 Vac	.01 V	PASS
	Spectrum Analyzer	< 1.0 Vac	,0/V	PASS
	Frequency Counter Chassis	< 1.0 Vac	.01V	PASS
	Power Meter Chassis	< 1.0 Vac	.012	PASS
4	Evacuate vacuum chamber and record pressure	<10 ⁻² torr	Pressure =torr	*
5	Thermal couple readings	TC1 = 22 ± 2 °C	TC1 = 22.2 °C	PASS
-			TC2= 22.7 °C	N/A
		1	TC3 = 22.2 °C	N/A
6	DRO L/A	0 to 1V	DRO L/A = .01 V	Pass
Ū	PLO L/A	0 to 1V	PLO L/A = O V	Pass
	Is PLO locked?	Yes	Yes <u>465</u>	
			No	Pass
7	PLO Frequency	57.290344 ± .0002 GHz	Freq. = 57,290325 GHz	Pass
	PLO Power	17 to 20 dBm	P = 19.2 dBm	Pless
8	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = <u>+/5.00</u> V	P435
	VM2 Voltage	-15 ± 0.1 V	VM2 = -/5.00 V	Pass
	IM1 Current	600 mA max.	$IM1 = \underline{499} mA$	Puss
	IM2 Current	100 mA max. 9/1/18	IM2 = 67.5 mA	Pass
	DRO L/A Voltage	O to IV plane	DRO L/A = 60.8 m V	Puss
	PLO L/A Voltage	11119-0017 14:00 \$ V	PLO L/A = /4,25 V	Pass
12	RF Output Power and	17 to 20 dBm	P = <u>19.2</u> dBm	Puss
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.290 325 GHz	P455
	Baseplate Temp. (TC1)	TC1 = 22 ±2°C	TCK= 22.4 °C	Pass
13	Frequency vs. Voltage	6		,
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.2 V	Pass
		-15.2 ± 0.05 V	$-Voltage = -/S_1 2 V$	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290325 GHz	P455
		17 to 20 dBm	P = <u>19.3</u> dBm	Pass

^{*}Record data only if performing test under vacuum

TEST DATA SHEET 6C (Sheet 2 of 4) Functional Testing (Paragraph 4.2.1)

		Functional Testing (Paragraph	4.2.1)	
_	1.464646	Post-Thermal Cycling CP	Т	
Paragra Step	ph 4.2.1.3 (Cont): Test	Expected	Measured	Pass/Fail
14	Frequency vs. Voltage			
14	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = +14.8_V	D
	± 15 v Supplies	-14.8 ± 0.05 V	-Voltage = -14.8 V	P455
		57.290344 ± .0002 GHz	Freq. = 57.290325 GHz	Puss
		17 to 20 dBm	$P = \frac{19.3}{4} dBm$	Phss
15	Spurious and Sub	-200 to -90 dBc	1 - 173 dbm	Phss
16	Power level of 114.58 GHz	<-10 dBm	-67 dBm	Pless
10	signal	2-10 dbiii	dBiii	Puss
17	Load VSWR and Frequency P	ulling	<u> </u>	
	2:1 mismatch over 1λ	N/A	Worst Case Freq = / h3	N/A
· ·····	2:1 mismatch over 1λ	N/A	Worst Case Power =d dB Peak	N/A
18	Operating Temperature	TC1 = 1 ±2°C	TC1 = 0.9 °C	Pass
	@ 1°C baseplate	(2)	TC2 1.3°C	N/A
	•	G.	TC3 2 0.8°C	N/A
	^	0-1۷ اس	DRO L/A = <u>.04</u> V	Pass
	9	-0-14 14 50V ± .40V	/PLO L/A = <u>/4.35</u> V	Puss
19	Input Voltage and Current	1198 Snigacibi	2	
	VM1 Voltage	+15 ± 0.1 V	VM1 = <u>/5,20</u> V	P455
	VM2 Voltage	-15 ± 0.1 V	VM2 = <u>-/4, 48</u> V	Pass
	IM1 Current	600 mA max.	$IM1 = \underline{489} mA$	Puss
	IM2 Current	100 mA max.	IM2 = <u>66.0</u> mA	Pass
	DRO L/A Voltage	oto IV pline	DRO L/A = <u>48.8</u> V	Puss
	PLO L/A Voltage	N -01017 14.60+	PLO L/A = 14.35 V	Pass
	RF Output Power	4/11/9817 to 20 dBm	Power =/9.7 dBm	Pass
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.290327 GHz	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.20 V	Pass
		-15.2 ± 0.05 V	-Voltage = - /5,20V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290327 GHz	Pass
		17 to 20 dBm	Power = $/8.8$ dBm	Pess
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>/4.80</u> V	Pass
		-14.8 ± 0.05 V	-Voltage = 14.80 V	Pass
		57.290344 ± .0002 GHz	Freq. = 57. 290327 GHz	Pass
		17 to 20 dBm	Power = $\frac{18.8}{100}$ dBm	Pass

TEST DATA SHEET 6C (Sheet 3 of 4) Functional Testing (Paragraph 4.2.1)

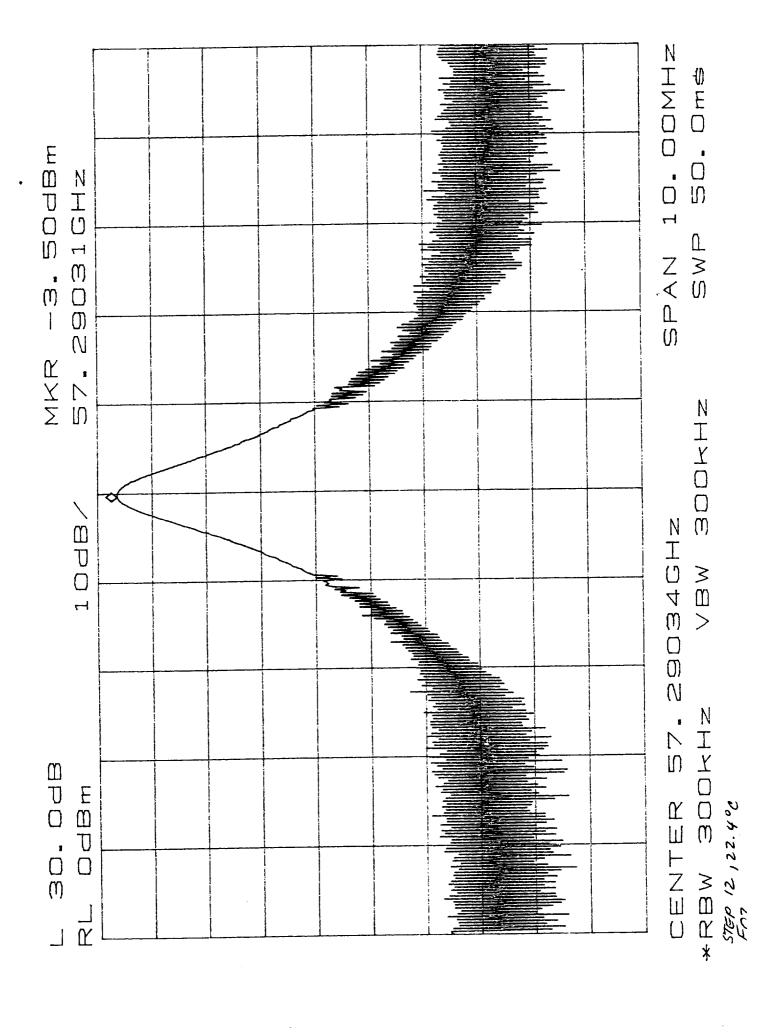
		Post-Thermal Cycling CI		
Paragra	ph 4.2.1.3 (Cont):	rost-flictmat Cycling Cr	71	
Step	Test	Expected	Measured	Pass/Fai
19	Spurious and Sub	-200 to -90 dBc	See Ploto	Rass
(Cont)	Power level of 114.58 GHz signal	<-10 dBm \$46	4.9.4 - 68 dBm	Puss
-	Load VSWR and Frequency F	Pulling	<u> </u>	1
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 2 ha	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = dB	N/A
21	Operating Temperature	TC1 = 44 ±2°C	TC1 = 43.7°C	Puss
	@ +44°C Baseplate		TC2 = 43.70L	N/A
1	_	السريا	TC3 = 43.71	N/A
		0-1V White	DRO L/A = <u>.0/</u> V	Pass
		9/11/9x -0-17/1460 =	PLO L/A = _/42V	Puss
22	Input Voltage and Current	1(· · · · · · · · · · · · · · · · · · ·	·	1
	VM1 Voltage	+15 ± 0.1 V	VM1 = 15.00 V	P255
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.02 V	Pass
	IM1 Current	600 mA max.	$IM1 = \underline{5//} mA$	Puss
ŀ	IM2 Current	100 mA max.	IM2 = <u> </u>	Pass
	DRO L/A Voltage	W O to IV ofures	DRO L/A = 1/9 m V	Pass
	PLO L/A Voltage	-0 to 14 14.80%	PLO L/A = 14.2 V	P
Ţ	RF Output Power and 9	17 to 20 dBm	Power = <u>/4./</u> dBm	Pass
	Frequency	57.290344 ± .0002 GHz	Freq. = <u>57.290317</u> GHz	Puss
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.2 V	Puss
ļ		-15.2 ± 0.05 V	-Voltage = <u>-/5-2</u> V	Pass
		57.290344 ± .0002 GHz	Freq. = <u>57.290318</u> GHz	Puss
Į		17 to 20 dBm	Power = $\frac{19.1}{\text{dBm}}$	Puss
	Frequency vs. Voltage			
ſ	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = $/48$ V	Puss
		-14.8 ± 0.05 V	-Voltage = <u>-148</u> V	Pass
		57.290344 ± .0002 GHz	Freq. = <u>\$7,290318</u> GHz	Pass
		17 to 20 dBm	Power = 19.1 dBm	Puss

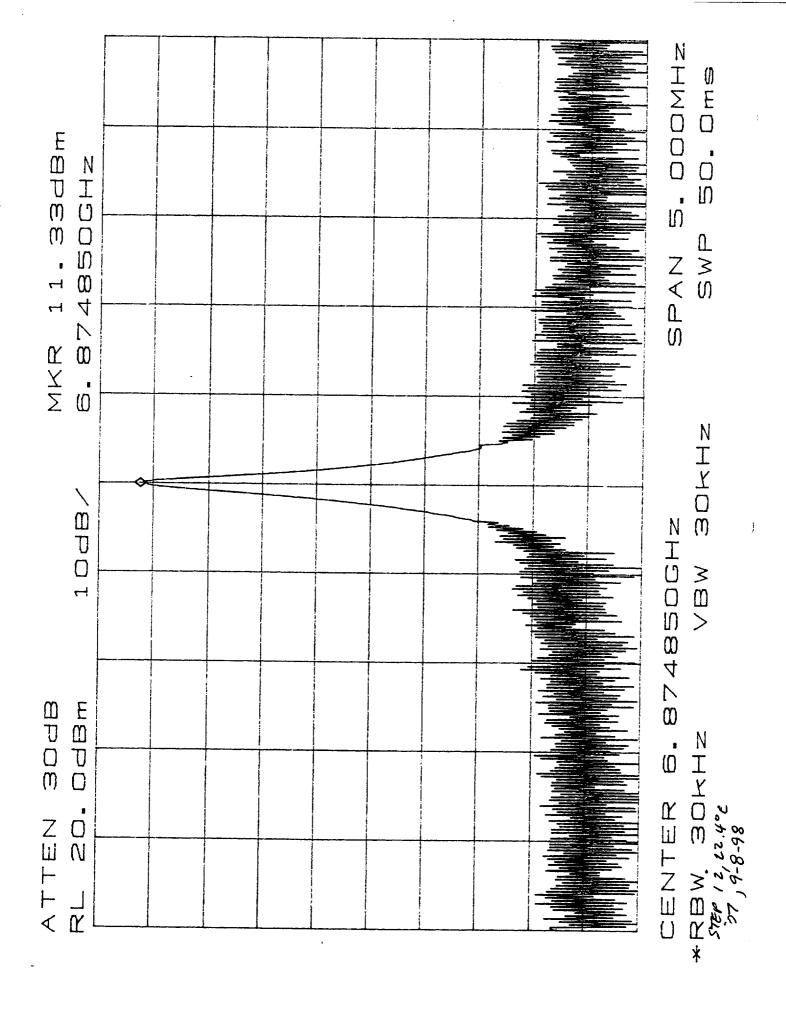
TEST DATA SHEET 6C (Sheet 4 of 4)

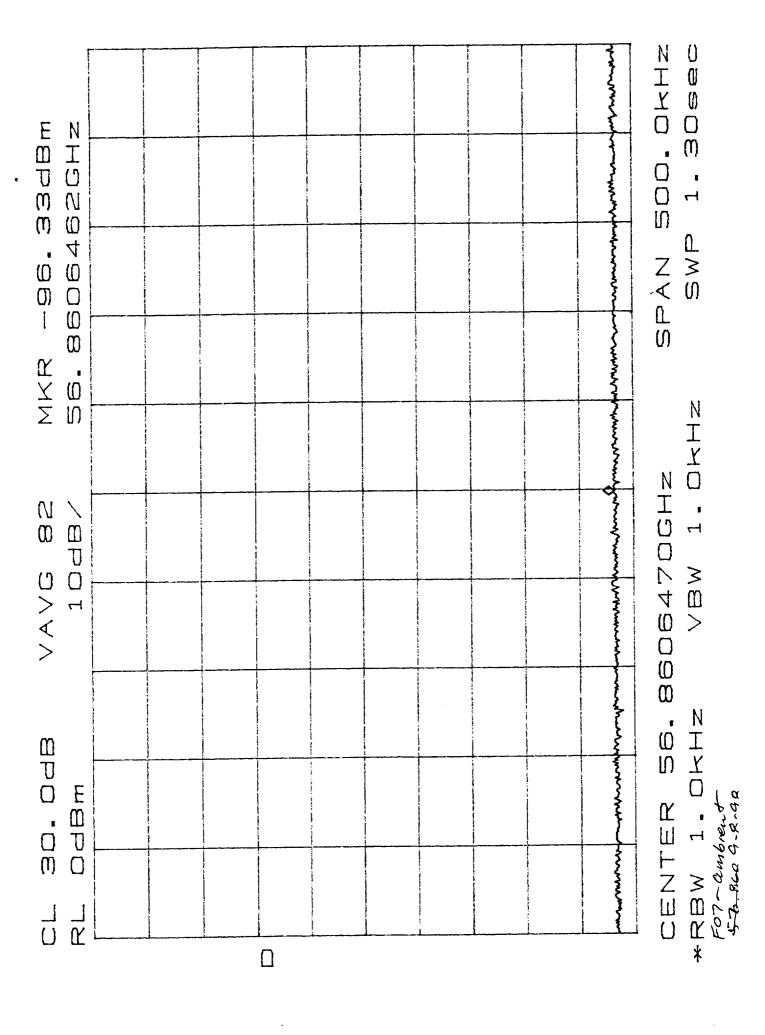
Dara	ph 4.2.1.3 (Cont):	Post-Thermal Cycling		
Step	Test	Expected	Measured	Pass/Fai
22	Spurious and Sub	-200 to -90 dBc	See Dlots	Pass
(Cont)	Power level of 114.58 GHz signal	<-10 dBm	dBm dBm	2
	Load VSWR and Frequency Pull	ing	S. Begross q.q. q	8
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 2 4/2	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power =dB	N/A

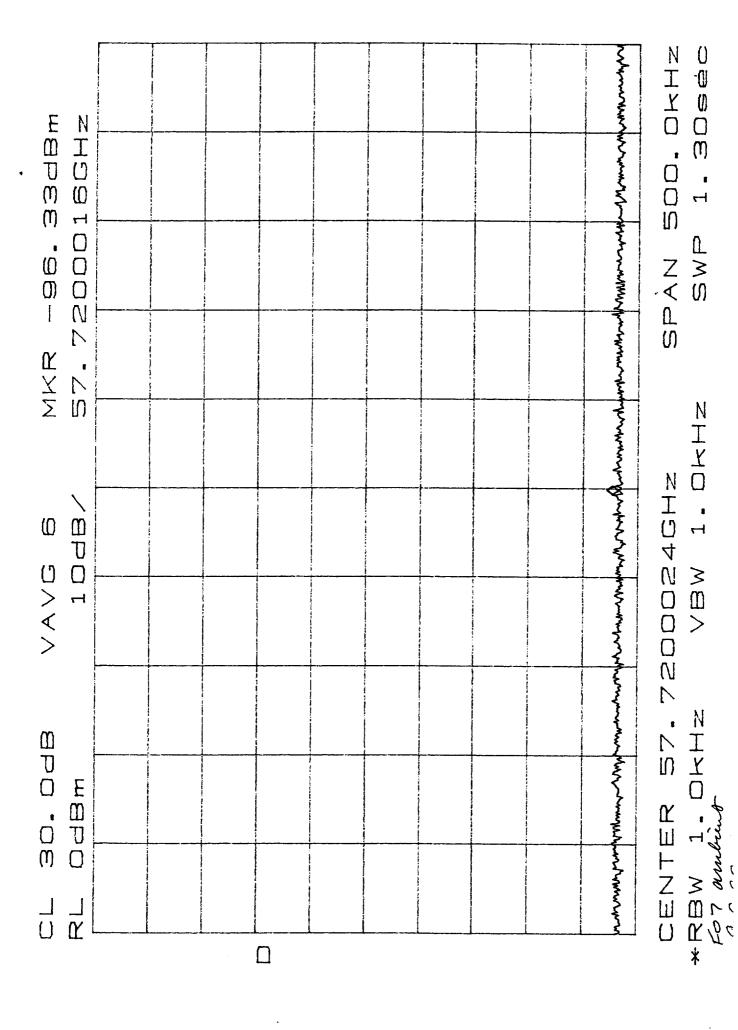
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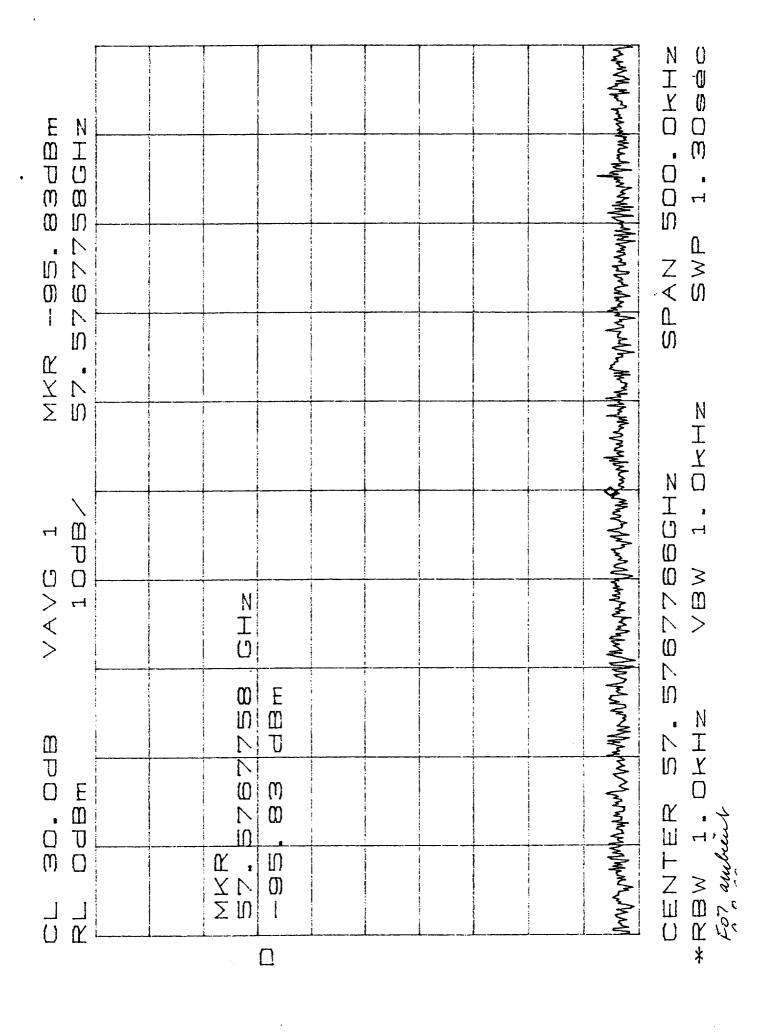
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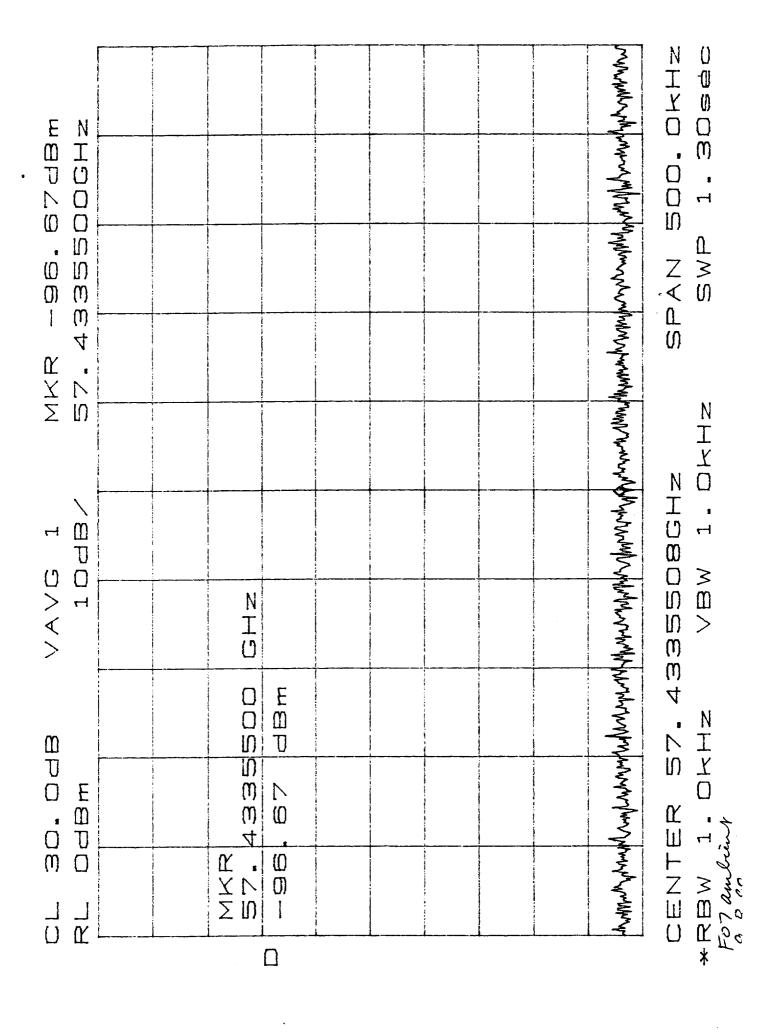


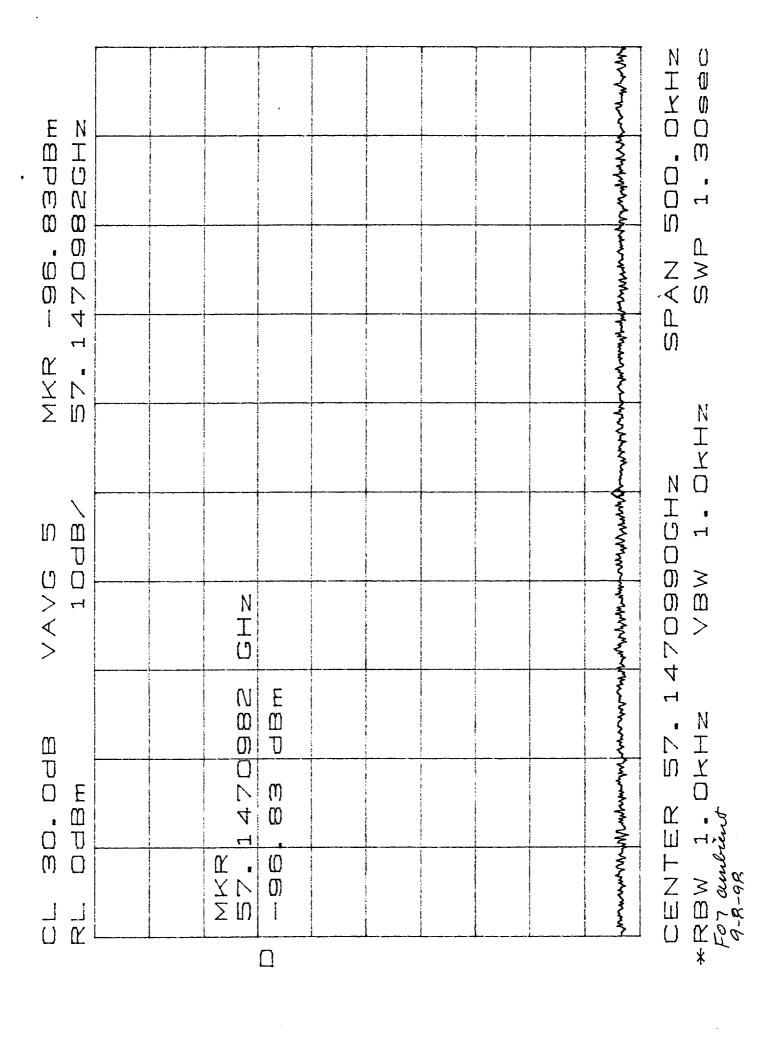


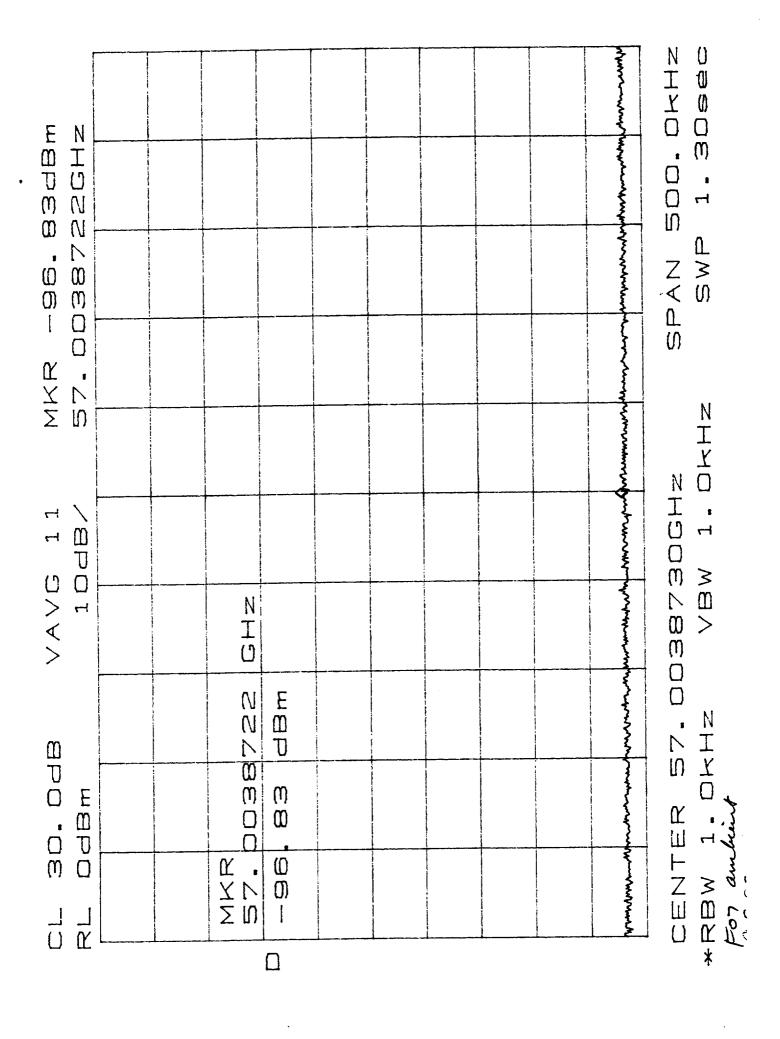


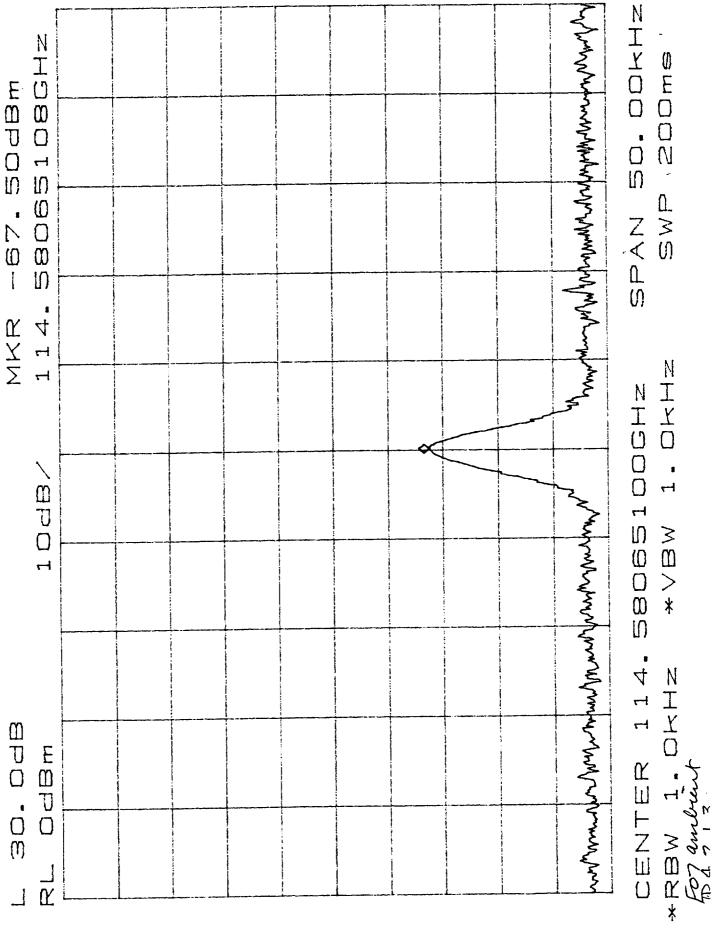












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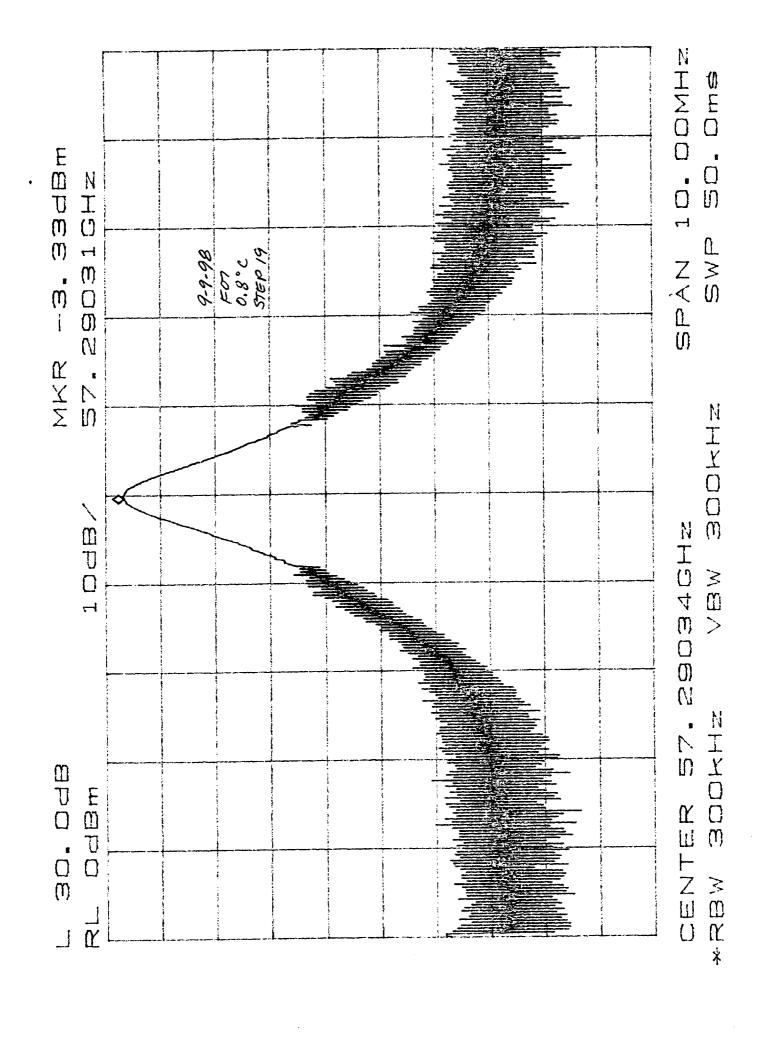
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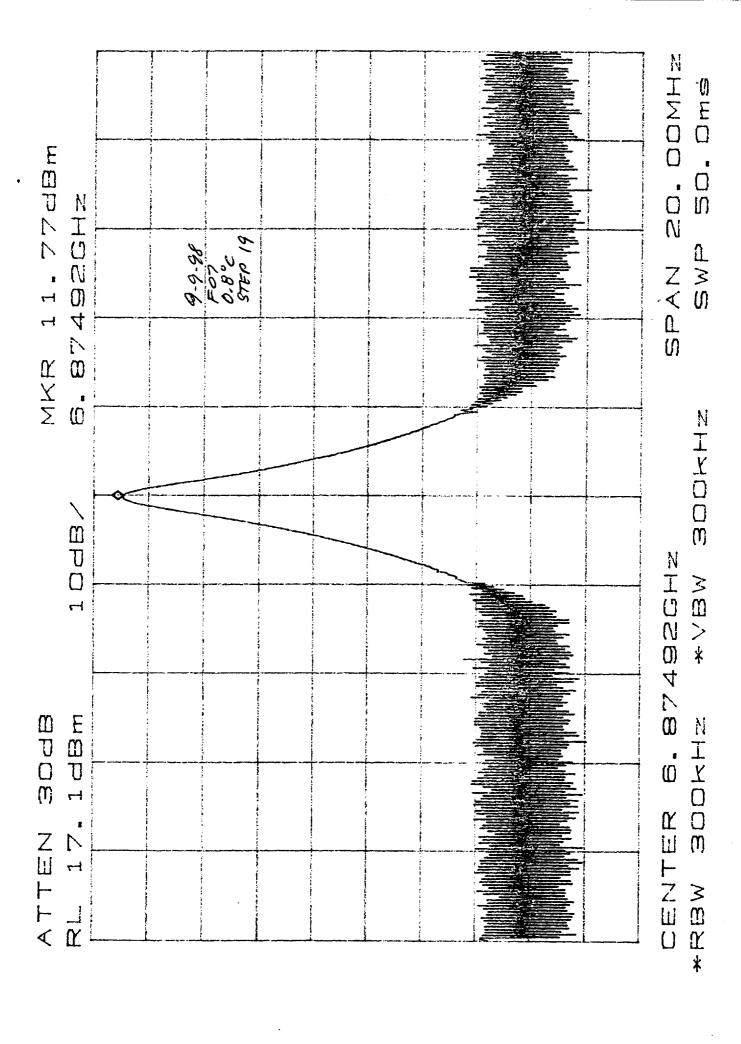
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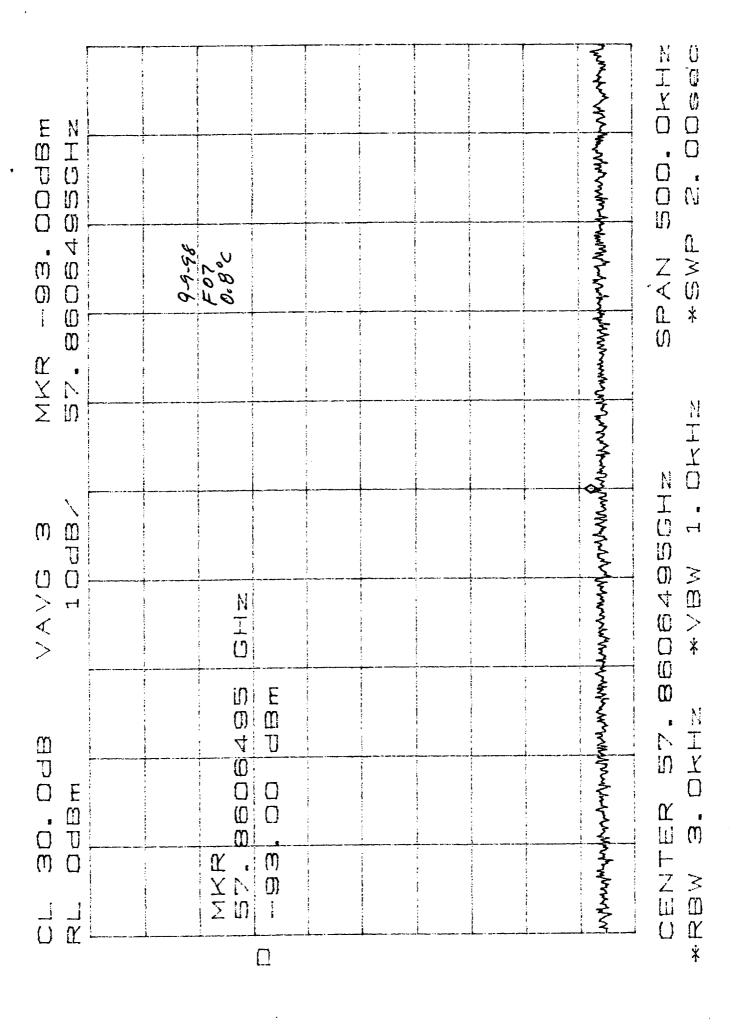
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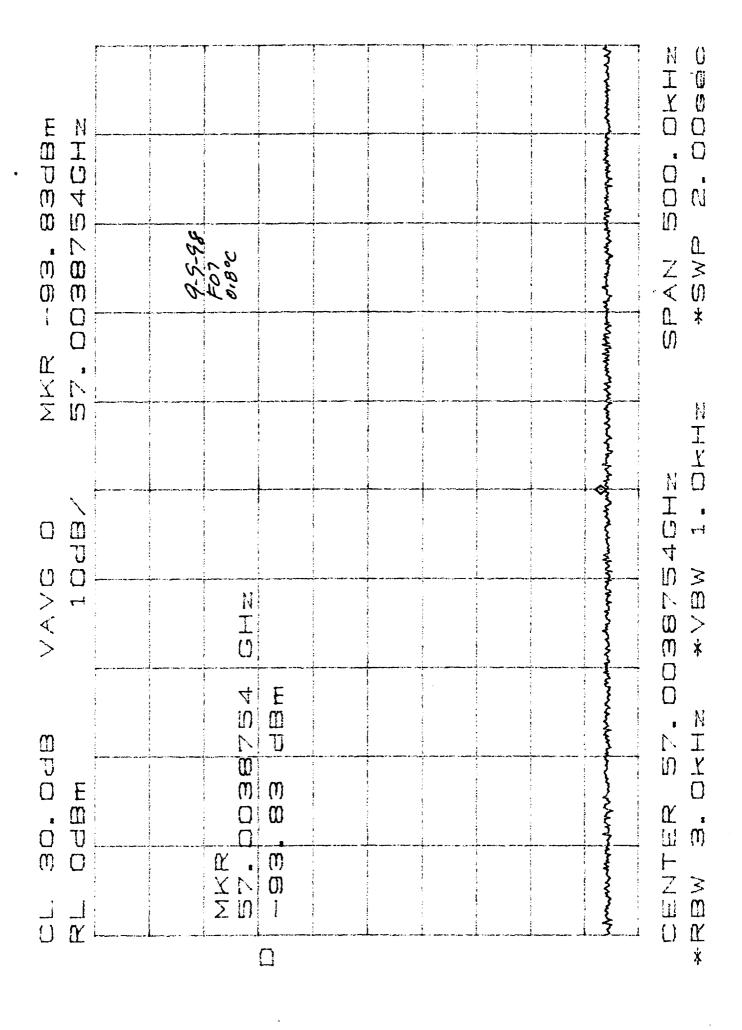
PCOTS 9-9-98

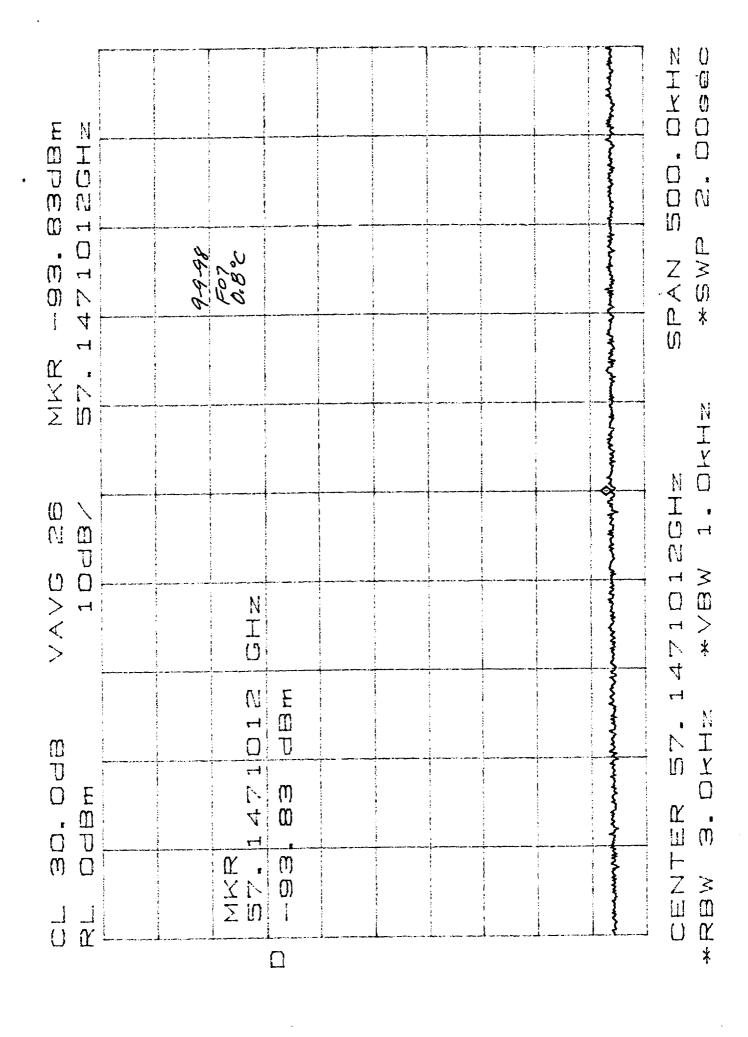
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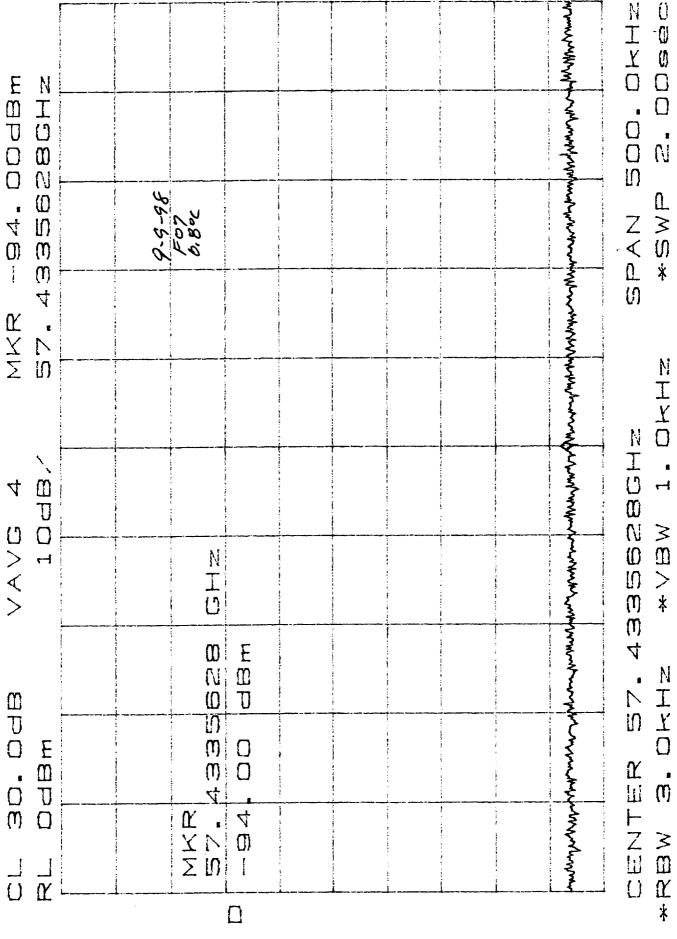


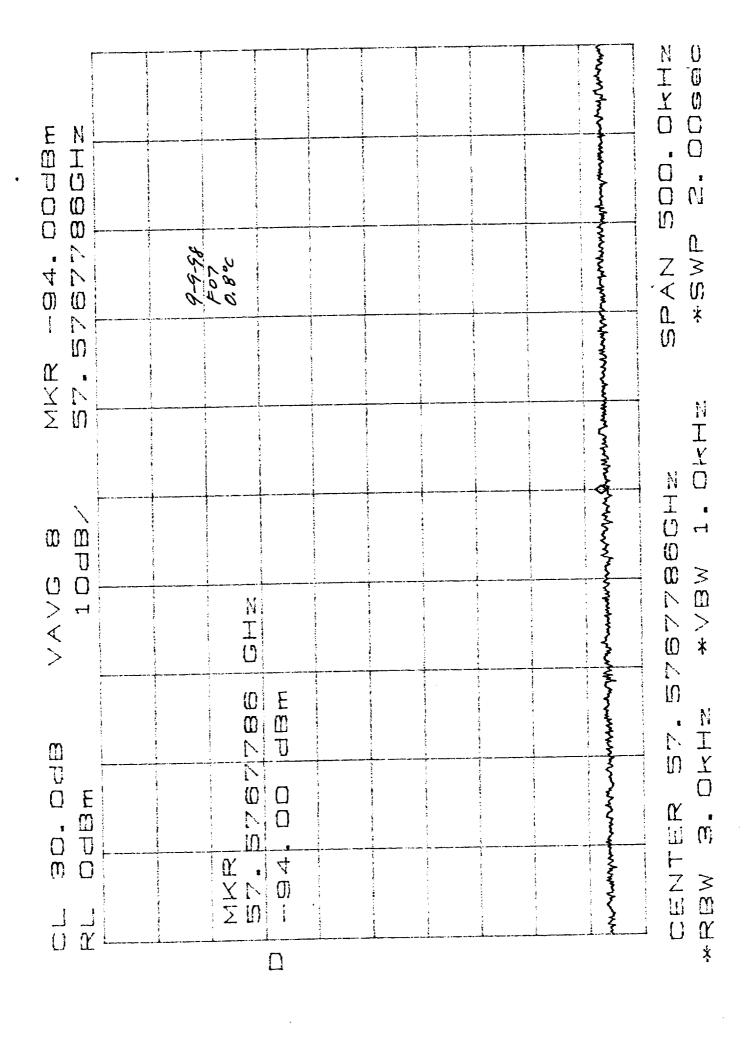


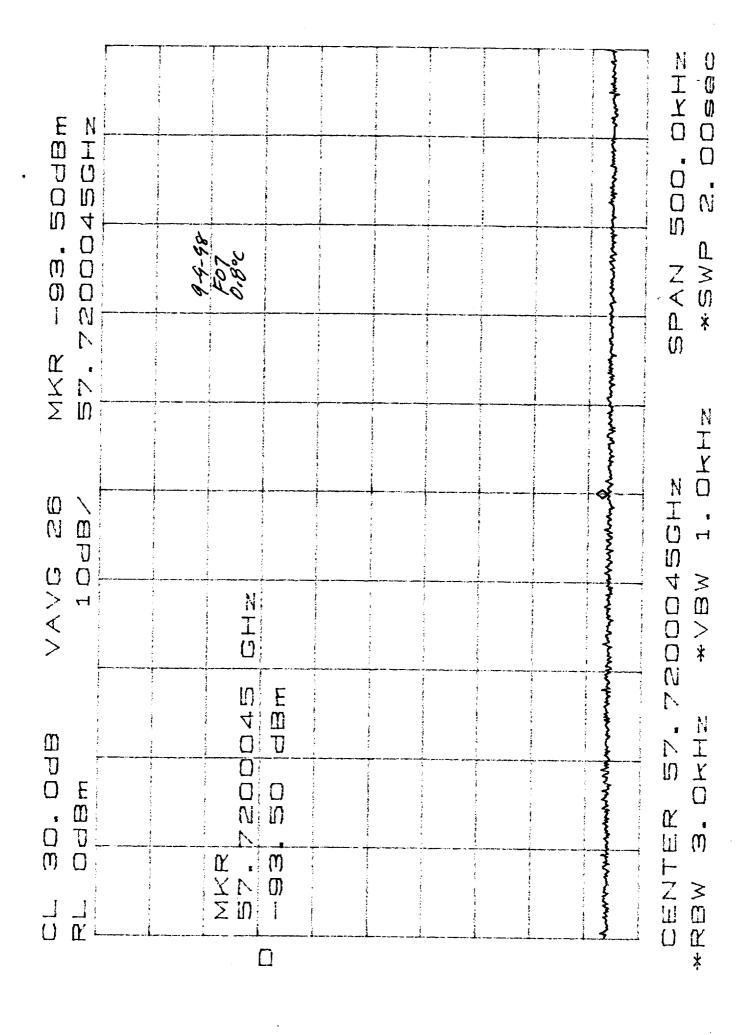


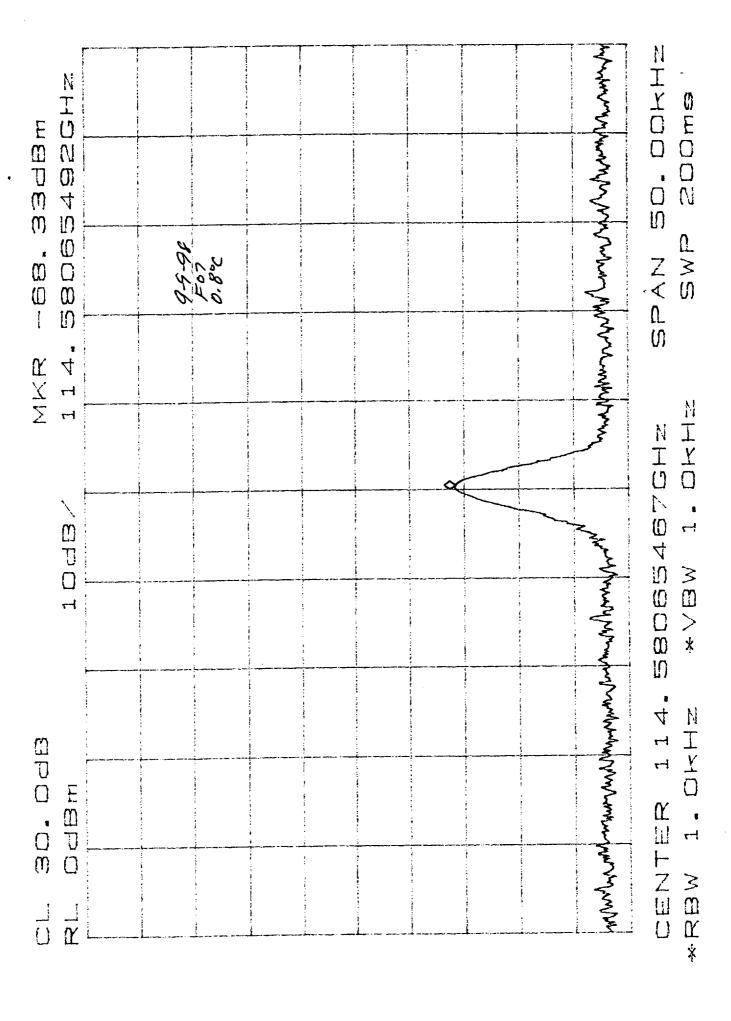






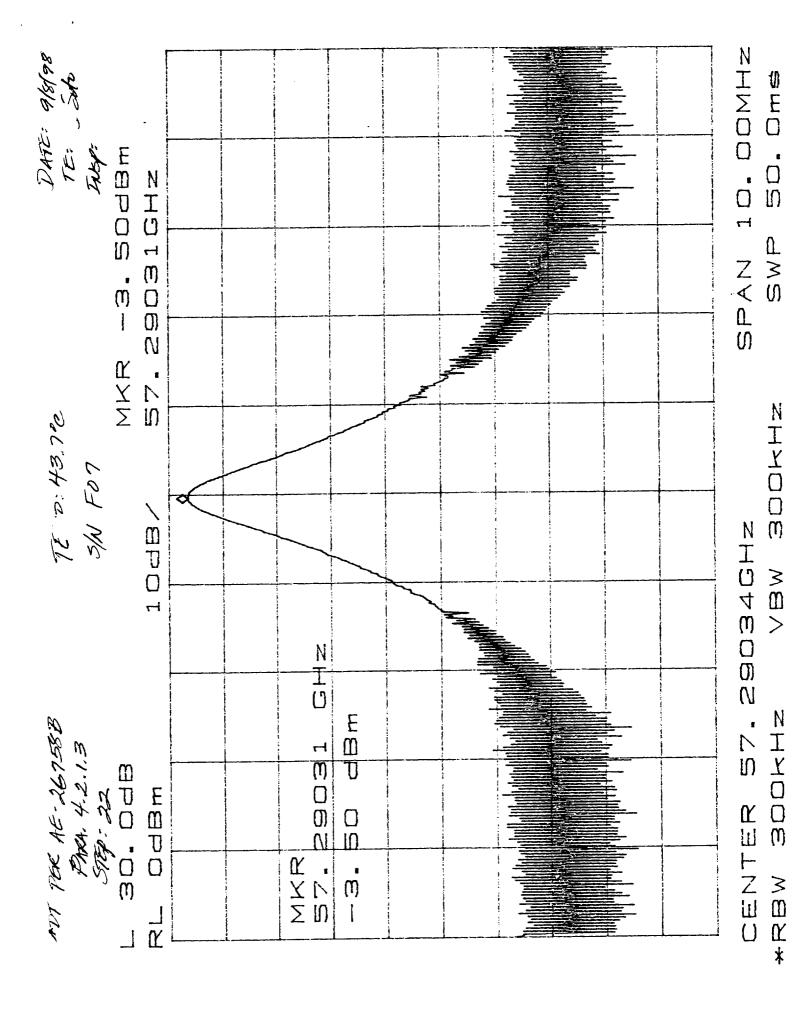


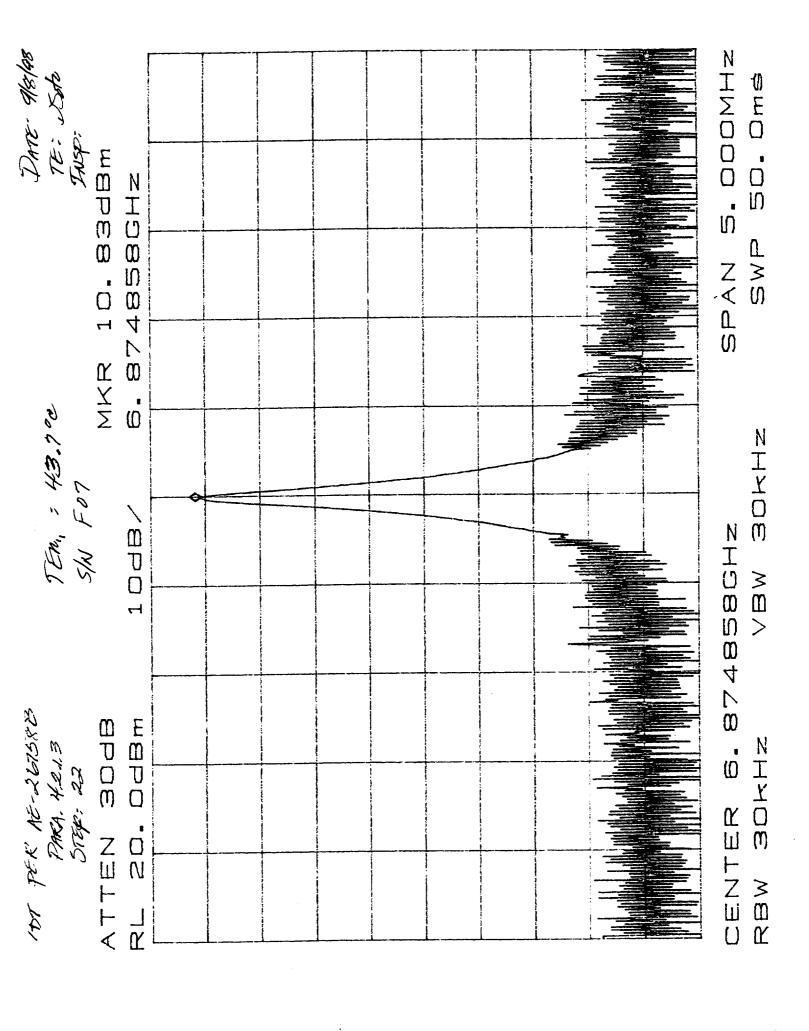




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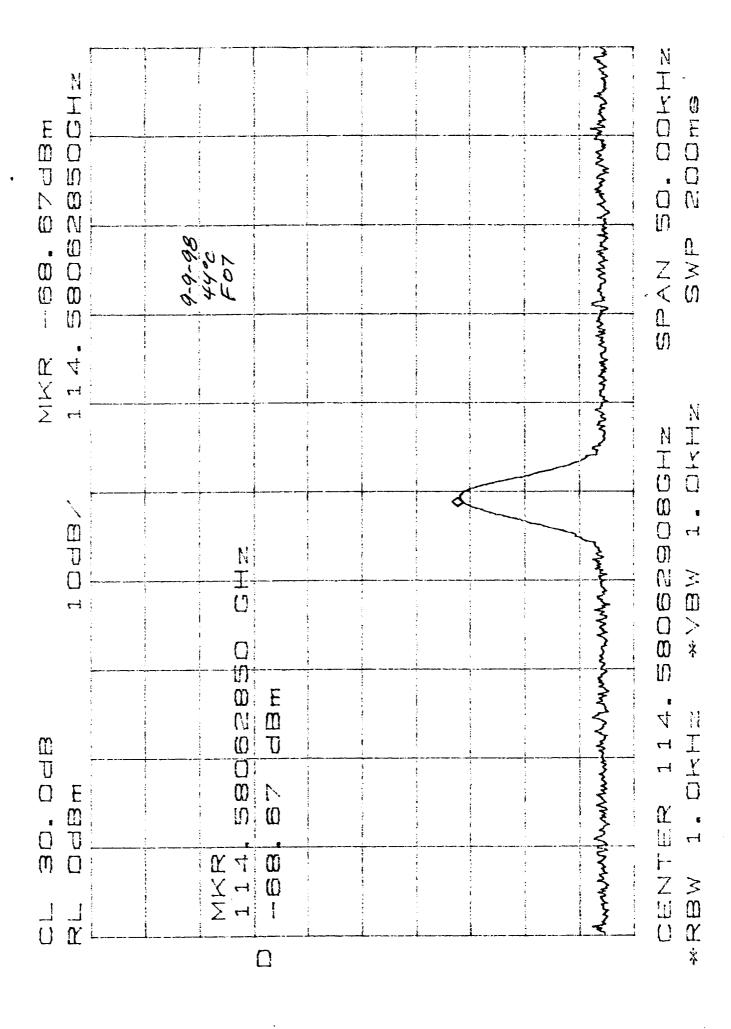
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Section 5B: Final Functional Testing - F08

This section contains the results of a full functional test over temperature taken after PLO F08 endured thermal cycling. All tests passed.

TEST DATA SHEET 6C (Sheet 1 of 4)

Functional Testing (Paragraph 4.2.1)

Test Setup Verified: OPinea	Post-Thermal Cycling CPT
Signature	

Paragra	ph 4.2.1.3, Functional Testing:			
Step	Test	Expected	Measured	Pass/Fai
1	Potential Difference from ± 15	V RTN to:		
	PLO Base Plate	< 1.0 Vac	0,006	PA55
	Spectrum Analyzer	< 1.0 Vac	0.01	PASS
	Frequency Counter Chassis	< 1.0 Vac	0.01	PASS
	Power Meter Chassis	< 1.0 Vac	6.01	Pass
4	Evacuate vacuum chamber and record pressure	<10 ⁻² torr	Pressure =torr	*
5	Thermal couple readings	TC1 = 22 ± 2 °C	TC1 = <u>23.3</u> °C	
		1.	TC2 = <u>23.3</u> °C	N/A
		lyke aluke	TC3 = <u>23.7</u> °C	N/A
6	DRO L/A	0 to 1V of or	DRO L/A =6/_ V	Puss
	PLO L/A	_0:01V 1450+V	PLO L/A = 143V	Phose
	Is PLO locked?	Yes	Yes	4-6-2
			No	
7	PLO Frequency	57.290344 ± .0002 GHz	Freq. = 57. 240326 GHz	
	PLO Power	17 to 20 dBm	P = <u>1747</u> dBm	
8	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	$VM1 = \underline{14.95} V$	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -15.04 V	Pass
	IM1 Current	600 mA max.	IM1 = <u>543</u> mA	Pass
	IM2 Current	100 mA max.	IM2 = 66.2 mA	Pass
	DRO L/A Voltage	NUT O to IV Whatile	DRO L/A = 260 mV	Pass
	PLO L/A Voltage	1164 DIOTA 14.40.4	PLO L/A = <u>/4.2</u> V	Pass
12	RF Output Power and	17 to 20 dBm	P = 17.93 dBm	Pass
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.290326 GHz	Pass
	Baseplate Temp. (TC1)	TC1 = 22 ±2°C	TC1 = <u>23.2</u> °C	Pass
13	Frequency vs. Voltage	1		
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.19 V	Pass
	1	-15.2 ± 0.05 V	-Voltage = -15.20 V	Pass
		57.290344 ± .0002 GHz	Freq. = 57. 290 327 GHz	Pass
		17 to 20 dBm	P = 18-6 dBm	Puss

^{*}Record data only if performing test under vacuum

TEST DATA SHEET 6C (Sheet 2 of 4)

Functional Testing (Paragraph 4.2.1)

Paragra	ph 4.2.1.3 (Cont):	Post-Thermal Cycling CP	Т	
Step	Test	Expected	Measured	Pass/Fai
14	Frequency vs. Voltage		· · · · · · · · · · · · · · · · · · ·	
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>/4.78</u> V	Pass
		-14.8 ± 0.05 V	-Voltage = <u>-/4-80</u> V	PASS
		57.290344 ± .0002 GHz	Freq. = <u>57. 290327</u> GHz	Pass
		17 to 20 dBm	P = <u>/\$.v</u> dBm	Puss
15	Spurious and Sub	-200 to -90 dBc	1-96-83 Plots	Pa.55
16	Power level of 114.58 GHz signal	<-10 dBm	dBm	Pass
17	Load VSWR and Frequency F	Pulling		
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 542	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power =dB Peak	N/A
18	Operating Temperature	TC1 = 1 ±2°C	TC1 = 0,8 °C	Pass
	@ 1°C baseplate		TC2 = 0,7°C	N/A
			TC3 = 0.2 °C	N/A
	۸.	N 0-1V	DRO L/A = 44-38 V 185 m V	pass
	Ψ~	-0-14 14.60±440	PLO L/A = 14.38 V	Pass
19	Input Voltage and Current	dining.		
	VM1 Voltage	+15 ± 0.1 V	VM1 = <u>/5.04</u> V	Pass
	VM2 Voltage	-15 ± 0.1 V	$VM2 = \frac{-15.04}{V}V$	Pass
	IM1 Current	600 mA max.	IM1 = <u>526</u> mA	Pass
	IM2 Current	100 mA max.	IM2 = 64.4 mA	Puss
	DRO L/A Voltage	O to IV	DRO L/A = <u>185 m</u> V	Pass
	PLO L/A Voltage	0101V 14 60.42V	PLO L/A = [4,38] V	Pass
	RF Output Power	9/11/9/17 to 20 dBm	Power = $\frac{18.0}{\text{dBm}}$	Pass
	Frequency	57.290344 ± .0002 GHz	Freq. = 57.2963/3 GHz	Pass
	Frequency vs. Voltage	· · · · · · · · · · · · · · · · · · ·		
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = 15.20 V	Puss
		-15.2 ± 0.05 V	-Voltage = <u>/5.20</u> V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290312 GHz:	Pass
		17 to 20 dBm	Power = 18.2 dBm	Pass
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = 14.80 V	Puss
		-14.8 ± 0.05 V	-Voltage = <u>/4,8</u> v	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290312 GHz	Pass
		17 to 20 dBm	Power = <u>/8,4</u> dBm	Pass

TEST DATA SHEET 6C (Sheet 3 of 4) Functional Testing (Paragraph 4.2.1)

Рага <i>р</i> та	ph 4.2.1.3 (Cont):	Post-Thermal Cycling CP	•	
Step	Test	Expected	Measured Measured	Pass/Fai
19	Spurious and Sub	-200 to -90 dBc	See plots	Pass
(Cont)	Power level of 114.58 GHz signal	<-10 dBm	69 dBm	
	Load VSWR and Frequency P	ulling		
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 5 hz	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power =dB	N/A*
21	Operating Temperature	TC1 = 44 ±2°C	TC1 = 44.3 0c	PASS
	@ +44°C Baseplate	ره مرا	TC2 = 44,4°C	N/A
		An hamiak	TC3 = 45:5	N/A
		0-1V 12/400	DRO L/A =V	PASS
		14.69×	PLO L/A =V	PASS
22	Input Voltage and Current			
	VM1 Voltage	+15 ± 0.1 V	VM1 = _/5. ° V	Pass
	VM2 Voltage	-15 ± 0.1 V	VM2 = -/5-2 V	PASS
	IM1 Current	600 mA max.	$IM1 = \underline{558} mA$	Pass
	IM2 Current	100 mA max.	$IM2 = \underline{C7.C} mA$	Puss
	DRO L/A Voltage	1 O to IV which	DRO L/A = 2874V	Pass
	PLO L/A Voltage	AT TO TO THE PARTY	PLO L/A = 14.2 V	•
	RF Output Power and	17 to 20 dBm	Power = <u>/7. L</u> dBm	PASS
	Frequency	57.290344 ± .0002 GHz	Freq. = 57, 290331 GHz	PASS
	Frequency vs. Voltage			
	± 15 V Supplies	+15.2 ± 0.05 V	+Voltage = <u>15.2</u> V	Pus3
	. ,	-15.2 ± 0.05 V	-Voltage = <u>-15.2</u> V	Pass
		57.290344 ± .0002 GHz	Freq. = 57.290334 GHz	PASS
		17 to 20 dBm	Power = 17.7 dBm	PASS
	Frequency vs. Voltage			
	± 15 V Supplies	+14.8 ± 0.05 V	+Voltage = <u>/4.0</u> V	PASS
		-14.8 ± 0.05 V	-Voltage = $-\frac{74.8}{}$ V	PASS
		57.290344 ± .0002 GHz	Freq. = <u>57.290334</u> GHz	PASS
		17 to 20 dBm	Power = 17.7 dBm	PASS

TEST DATA SHEET 6C (Sheet 4 of 4) Functional Testing (Paragraph 4.2.1)

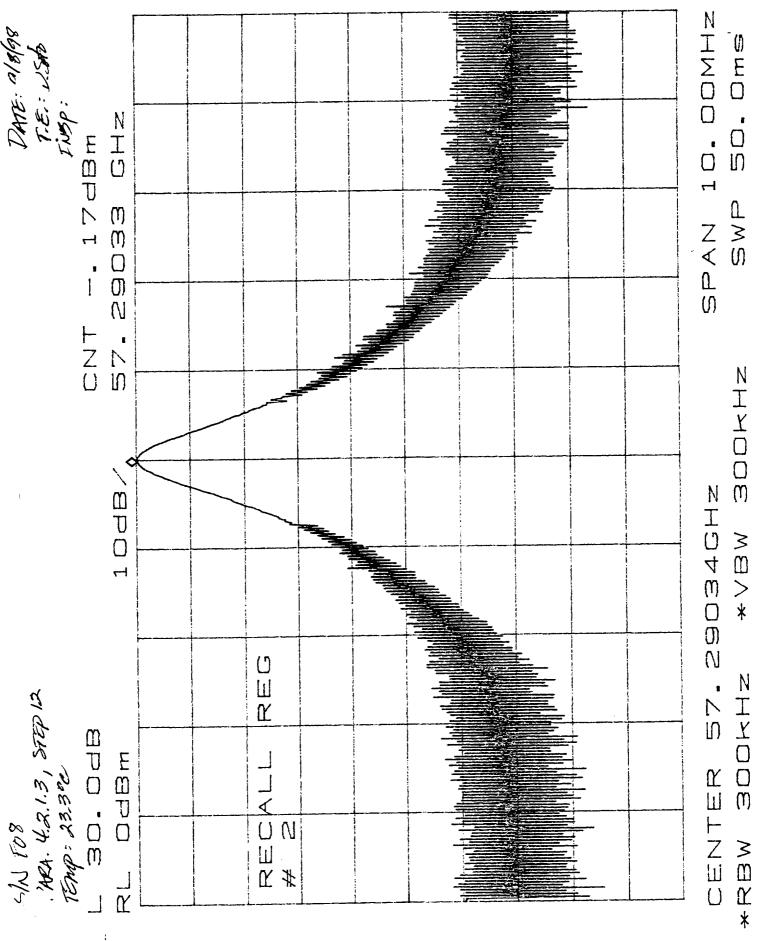
Step	Test	Expected	Measured	Pass/Fa
22	Spurious and Sub	-200 to -90 dBc	Sep Plots	Pas
(Cont)	Power level of 114.58 GHz signal	<-10 dBm	dSdBm	Pass
	Load VSWR and Frequency Pul	ling		1 2 - 3 -
	2:1 mismatch over 1λ	N/A	Worst Case Freq = 5 H2	N/A
	2:1 mismatch over 1λ	N/A	Worst Case Power = /. 0 dB	N/A

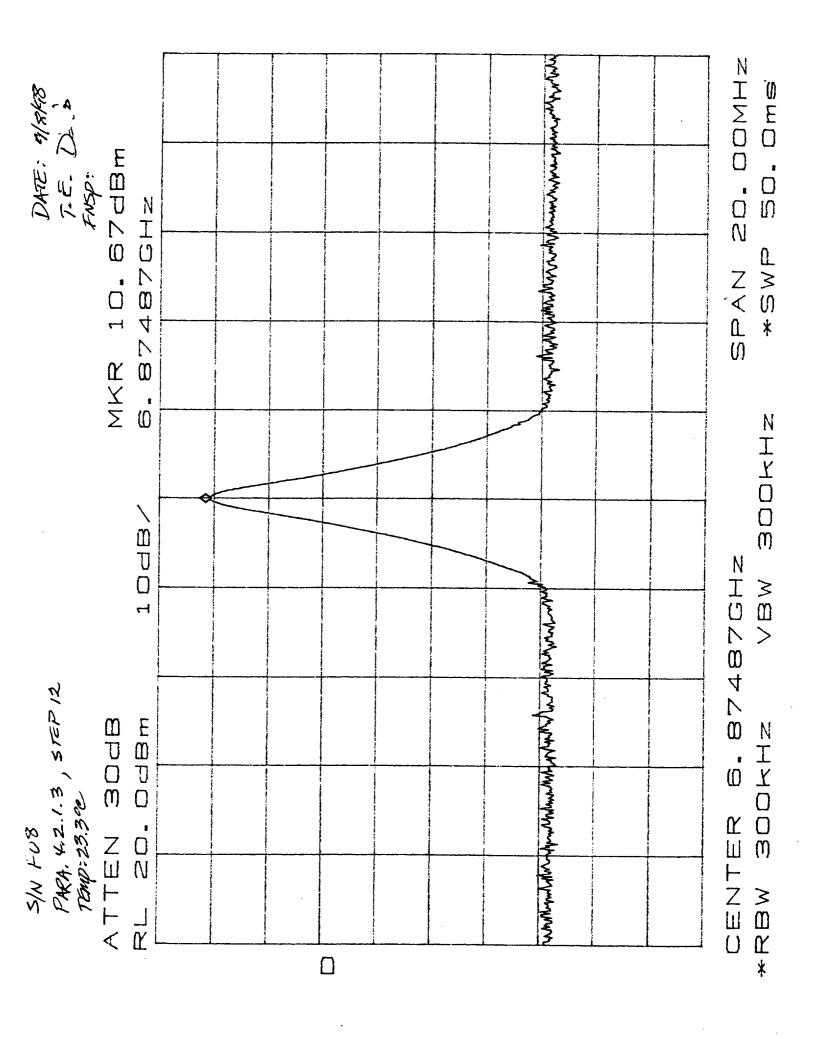
Shop Order No.: 534922	Test Engineer: Sullingnows 9-9-98
Operation:	Quality Control: 40 Eoz 9/1/198
Unit Serial No.: FOB	Govt. Rep.: 2 Rosen 9-11-98
Date:9-9-98	

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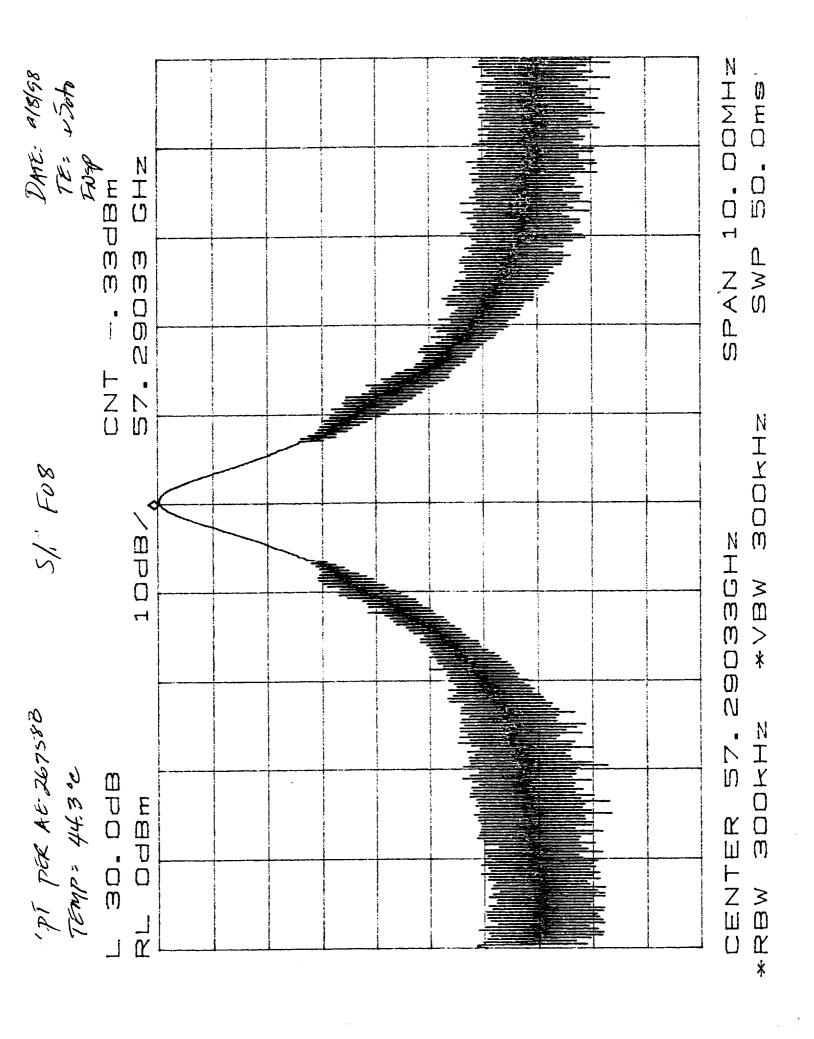
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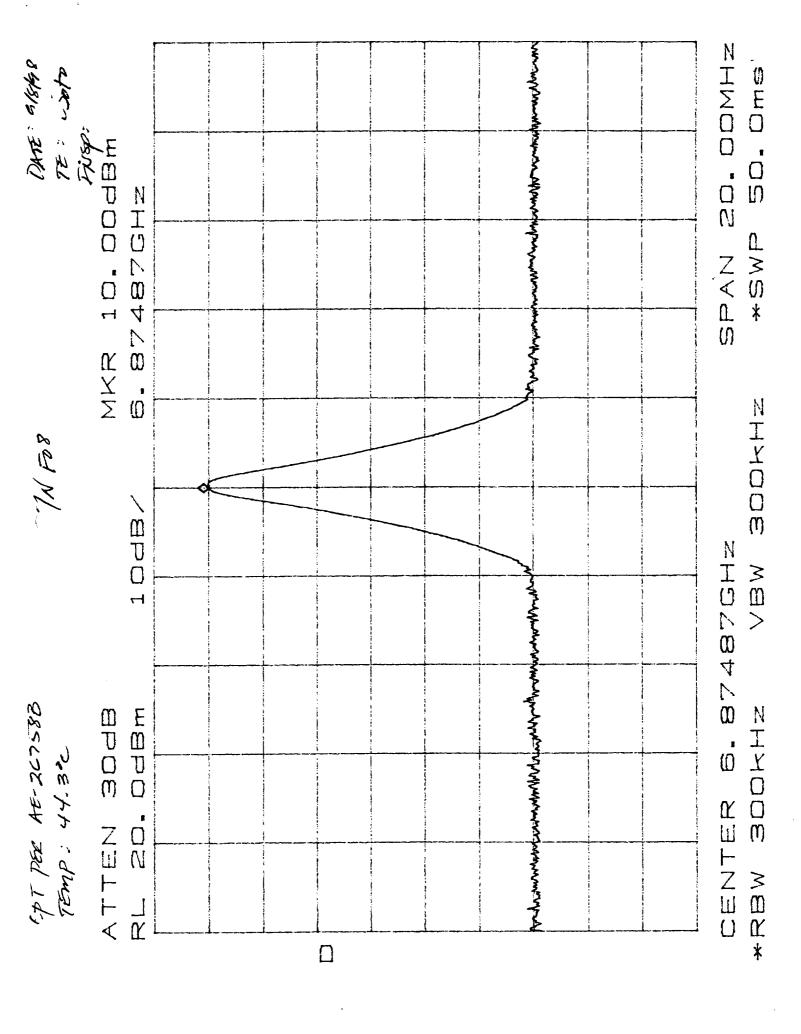
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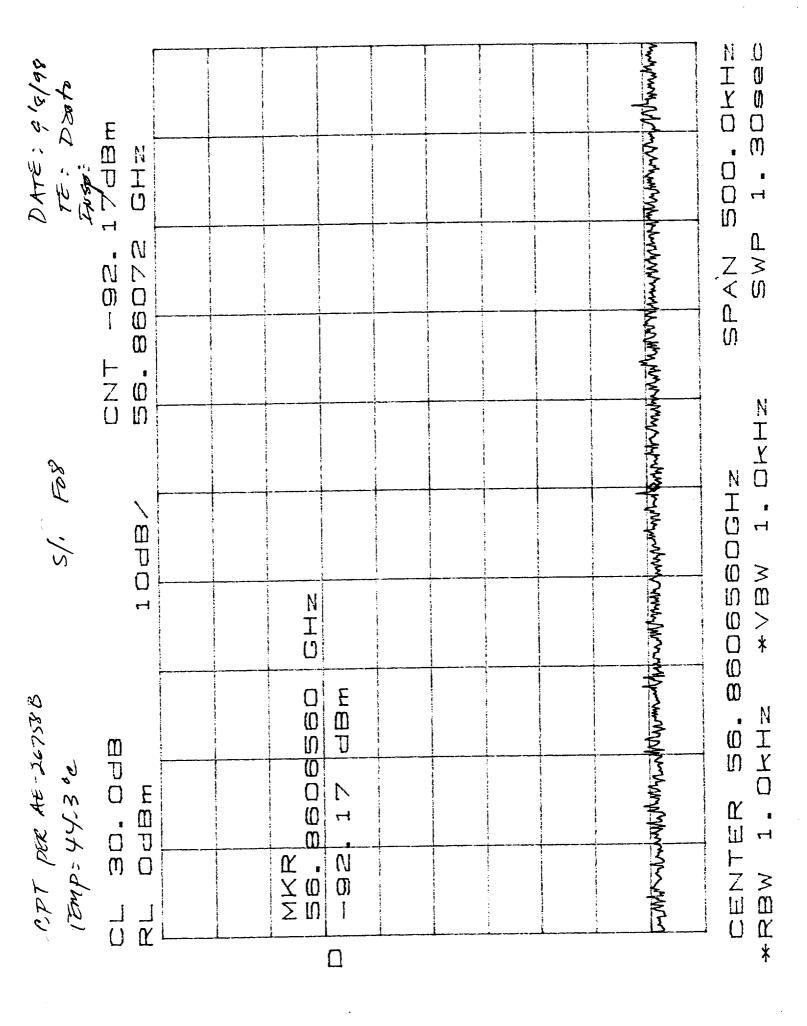
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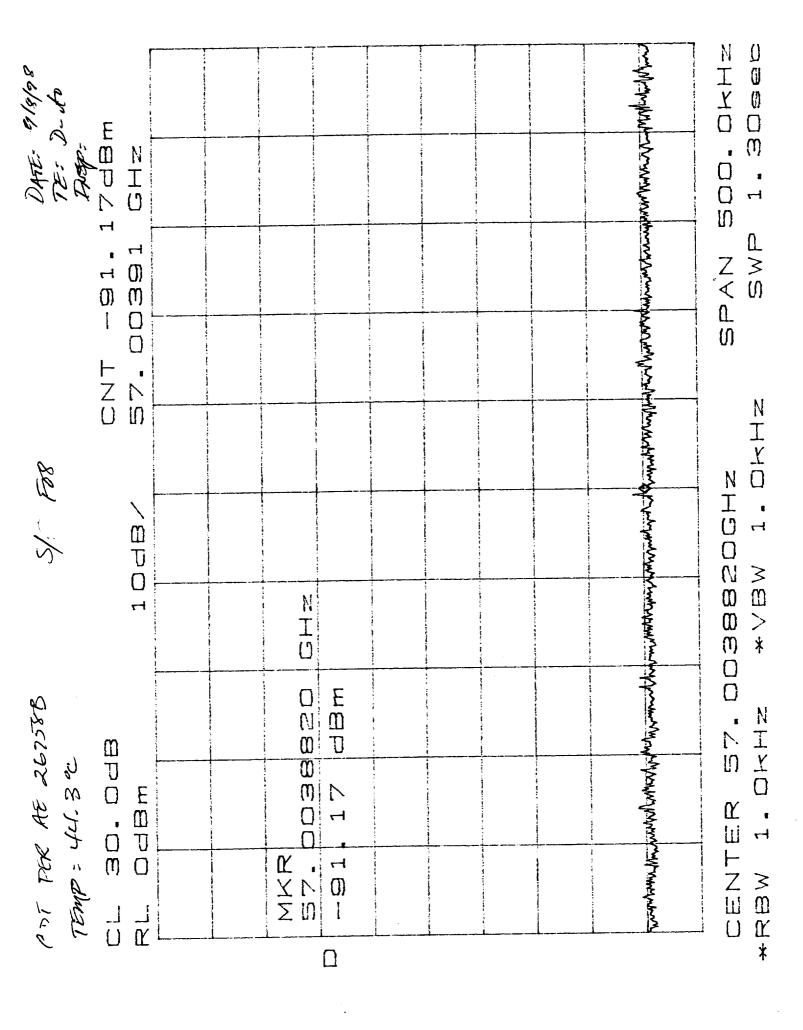
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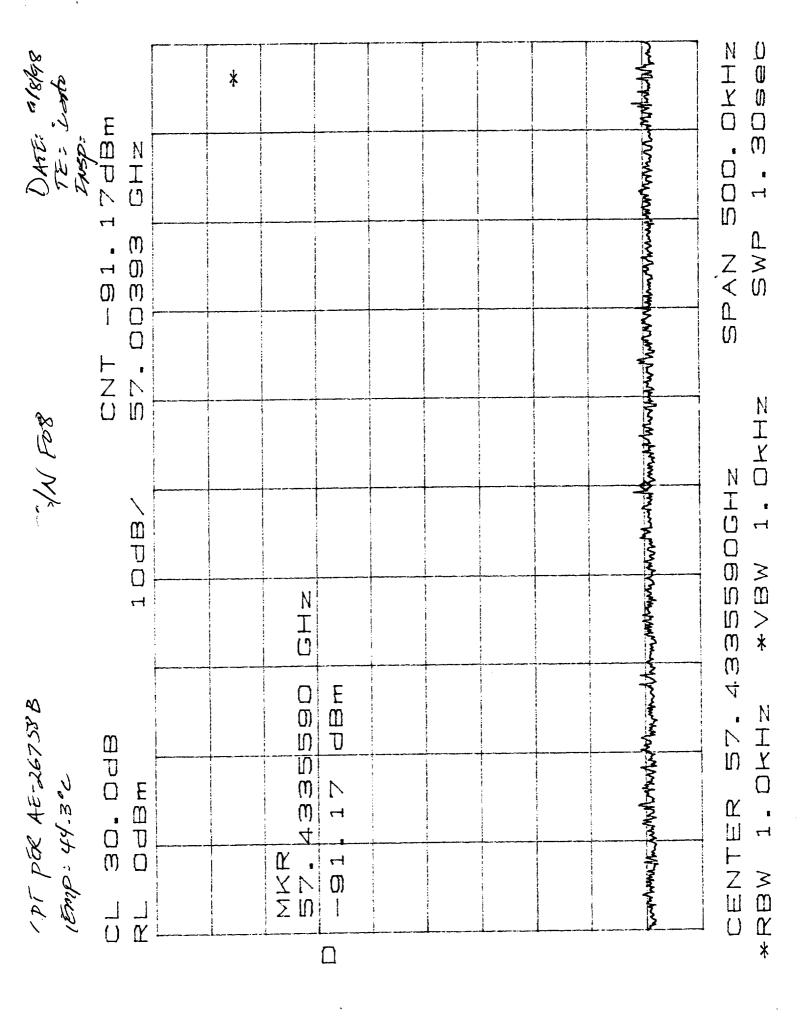




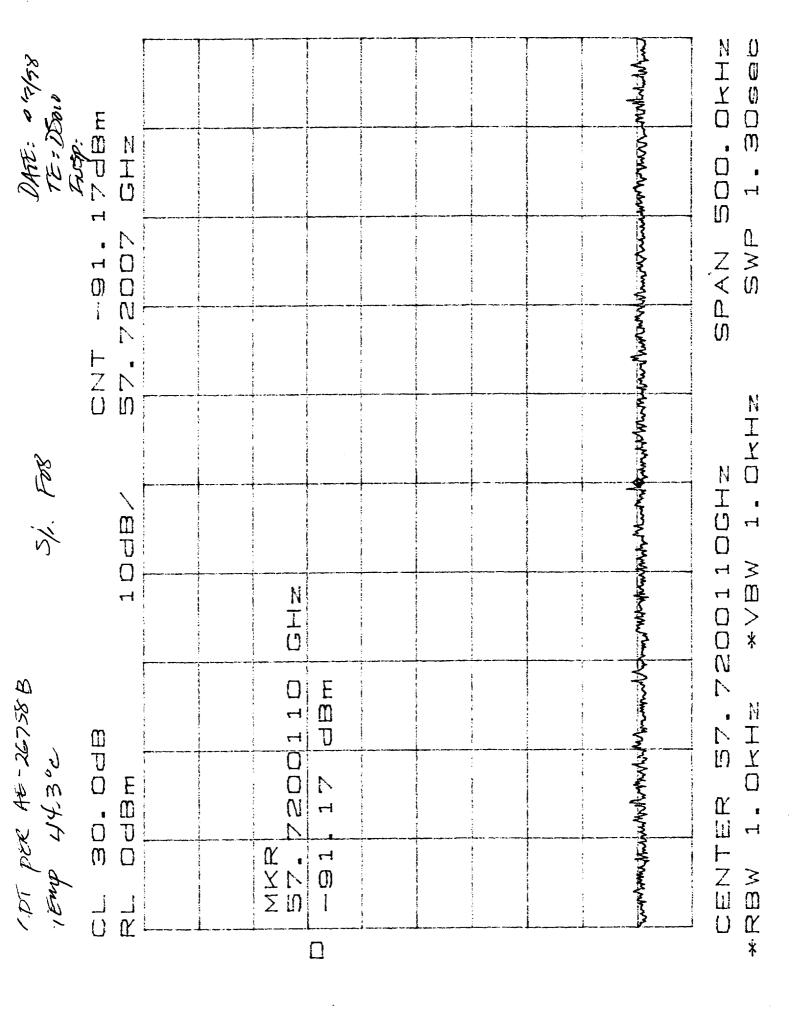


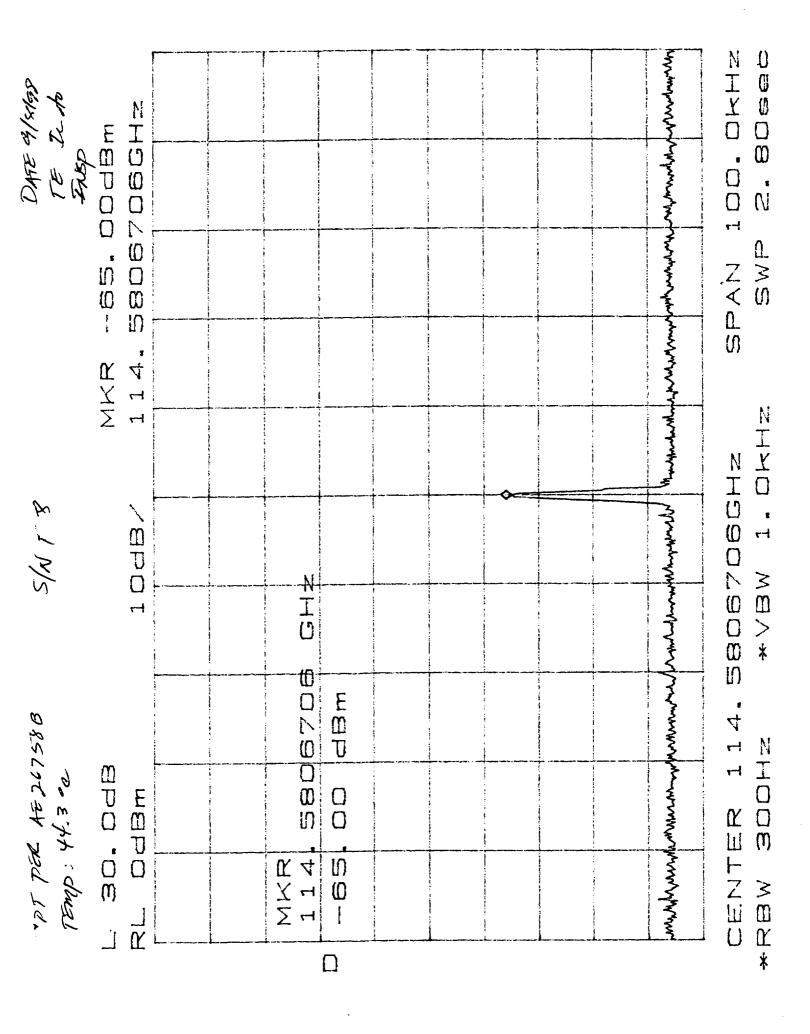


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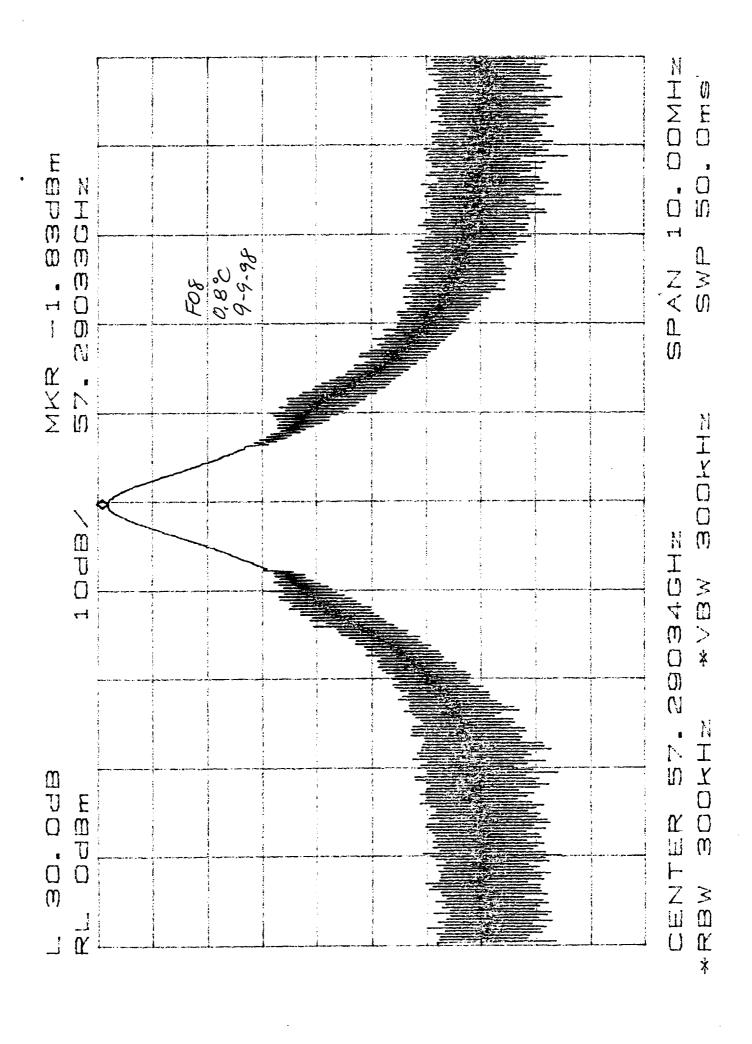
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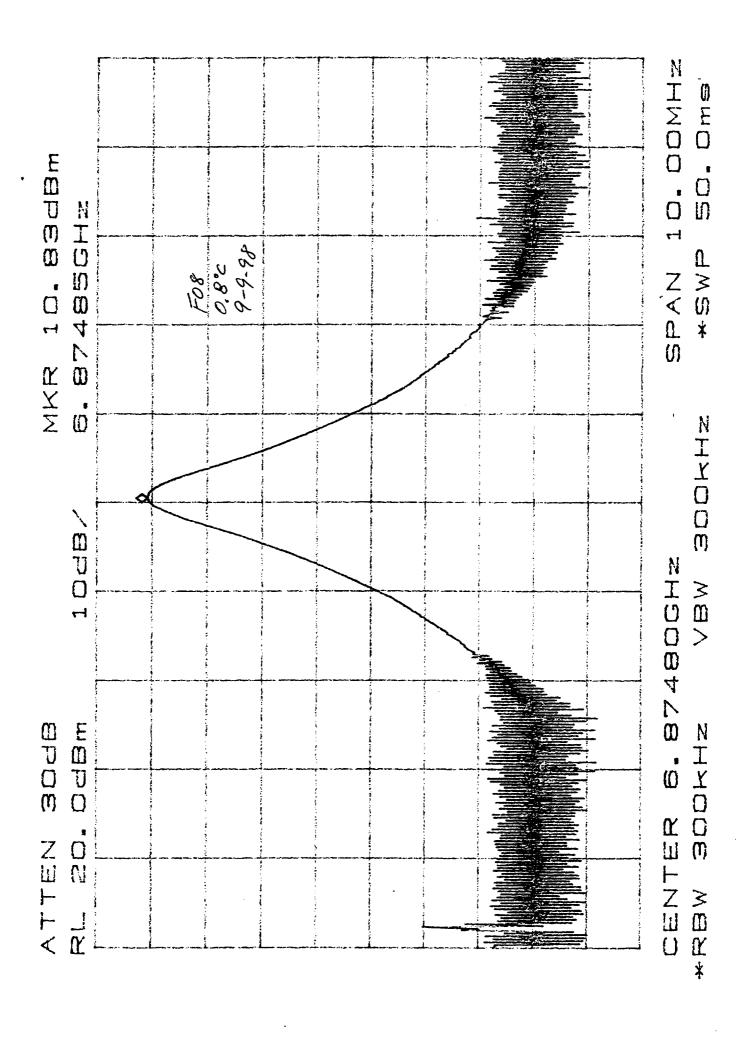


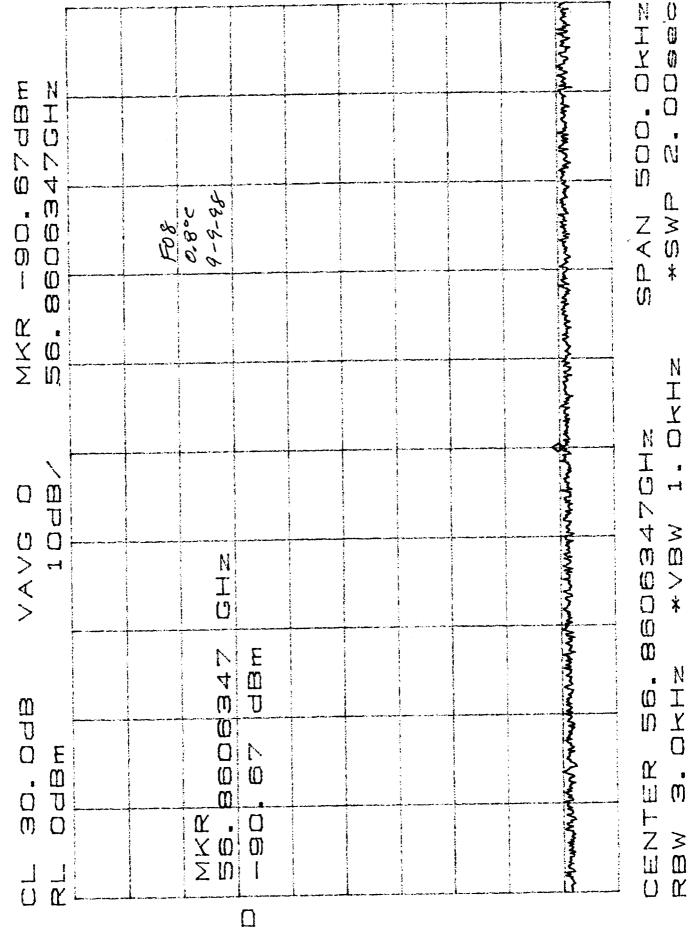


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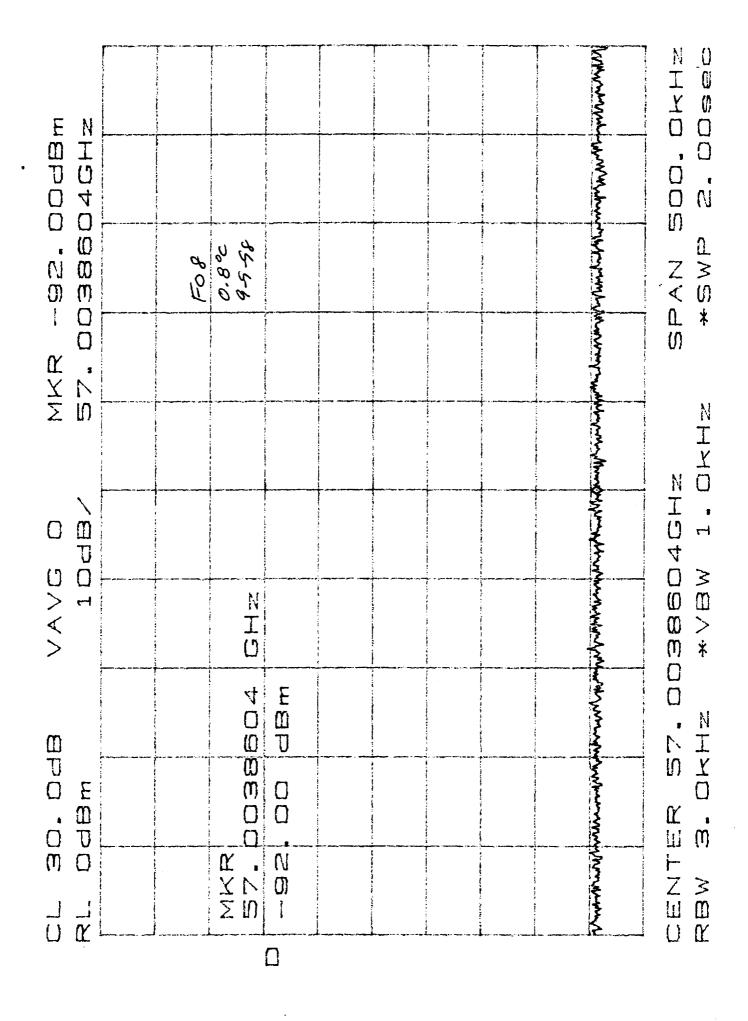
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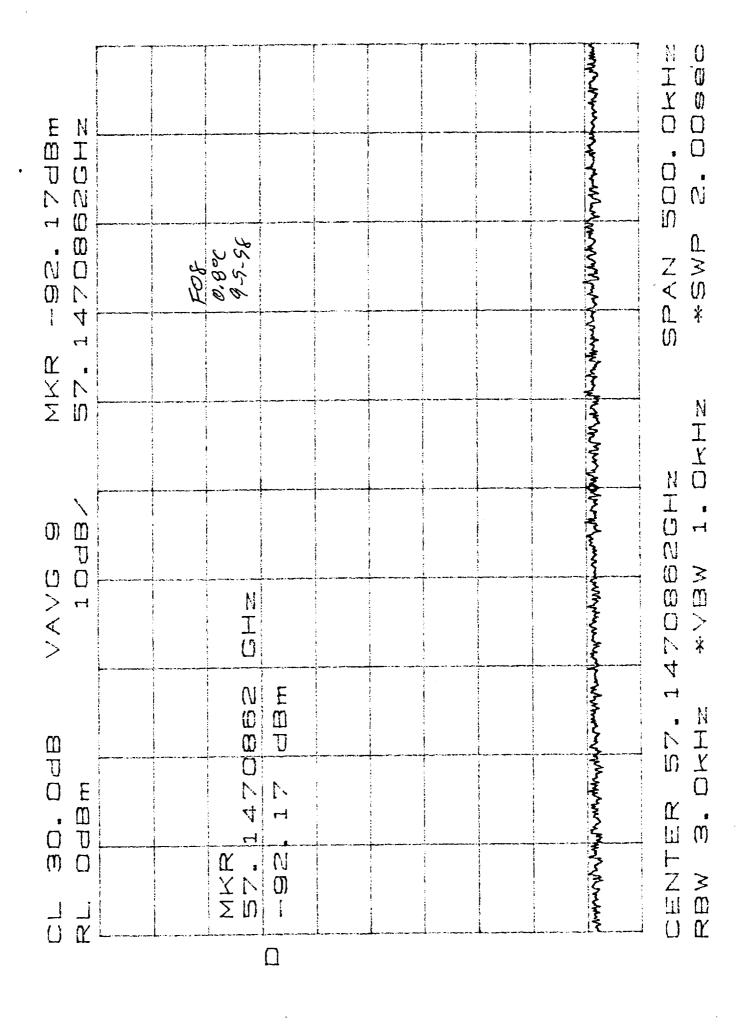


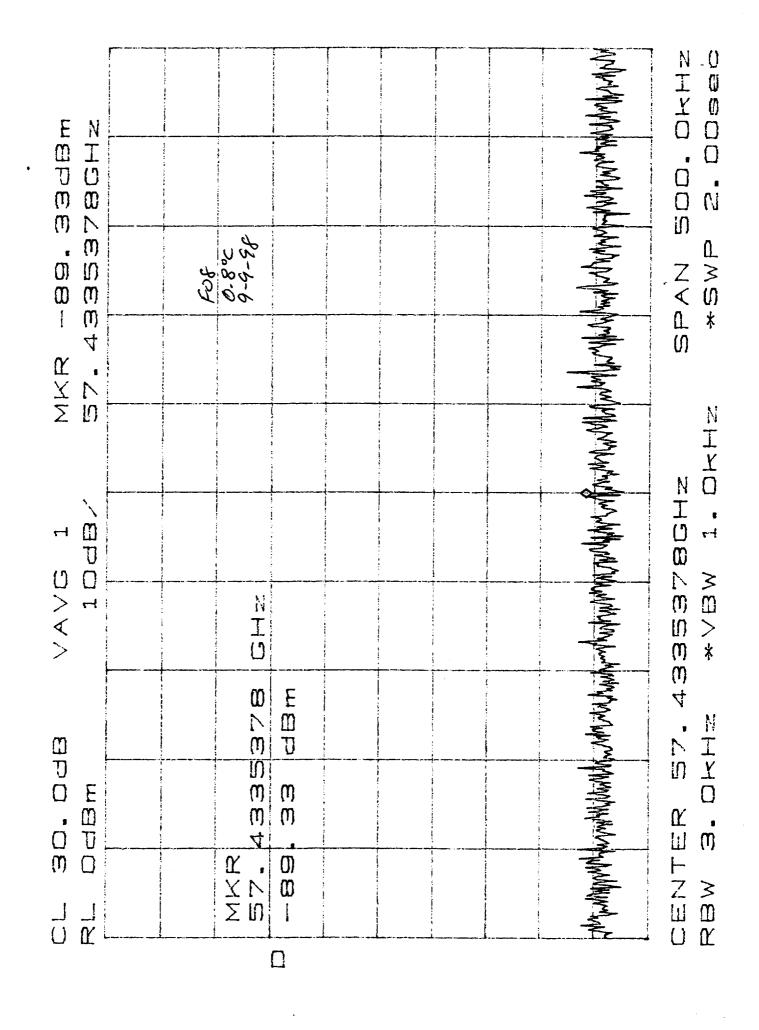


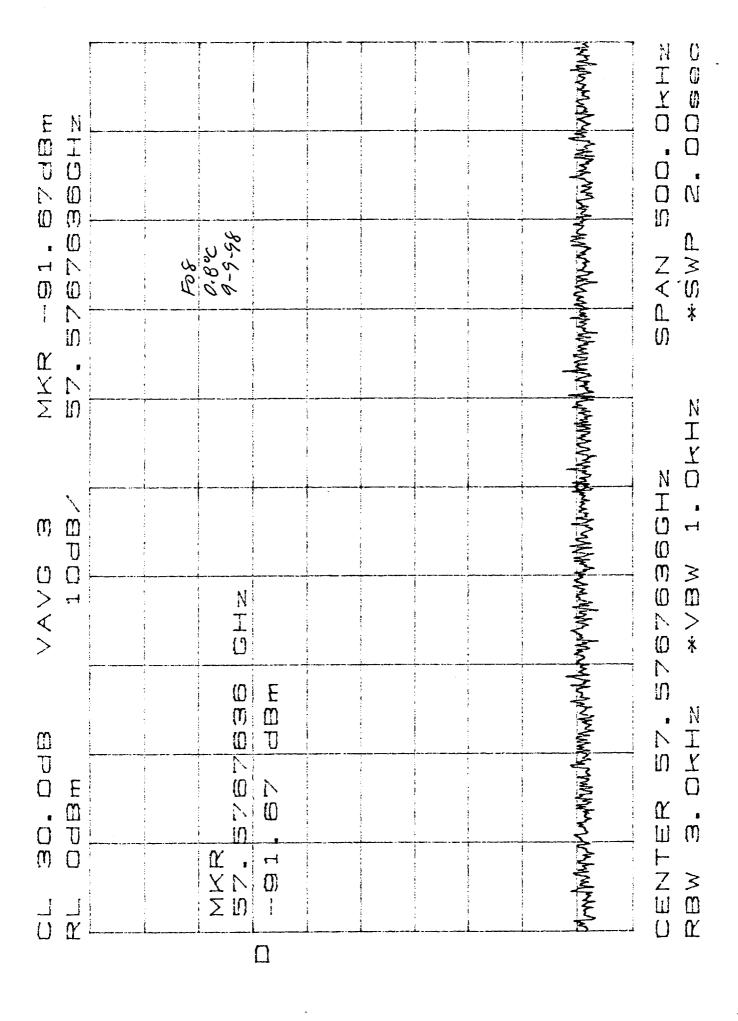


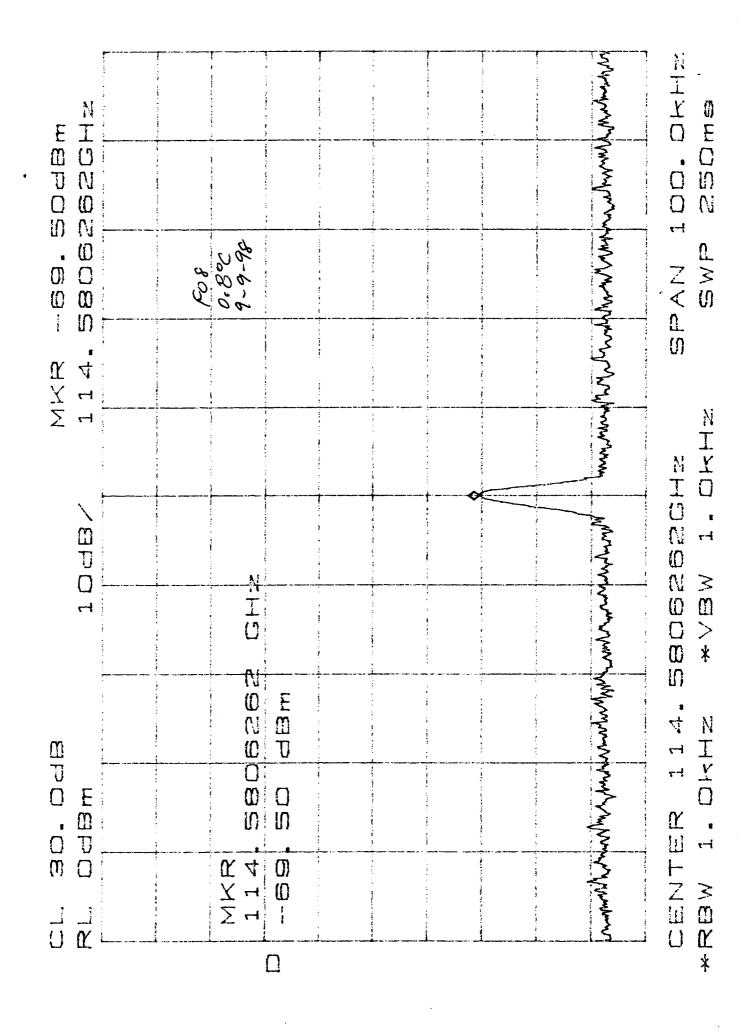
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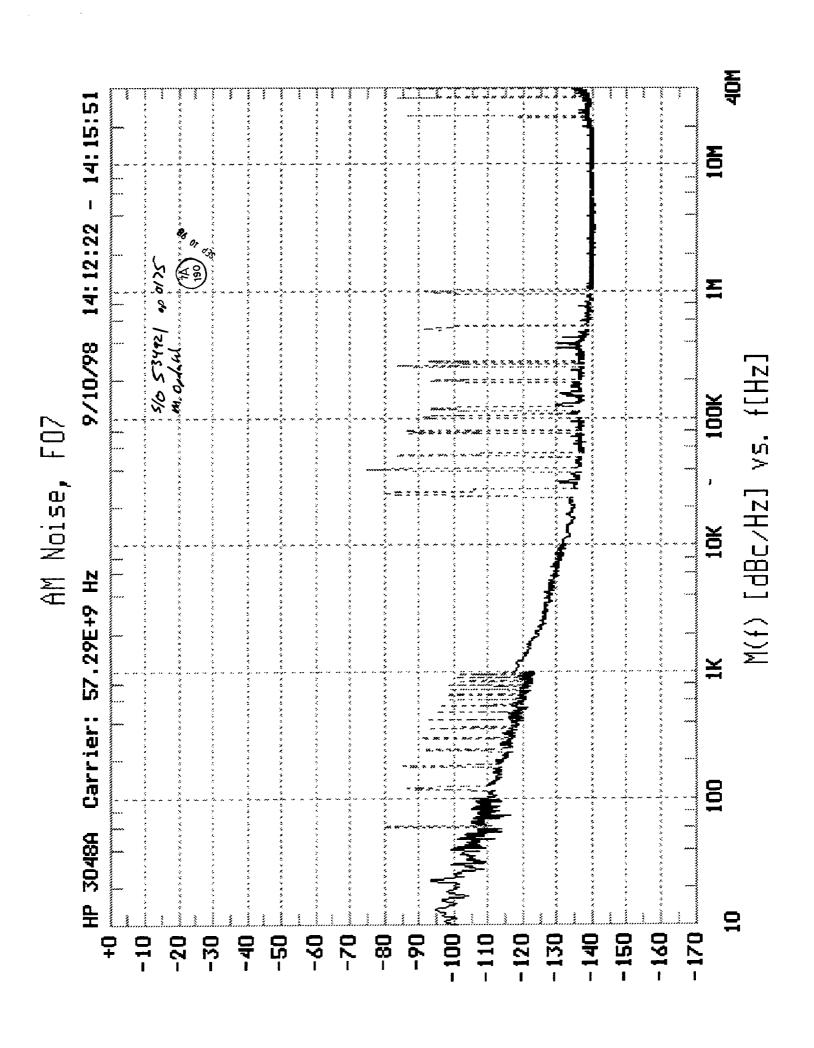


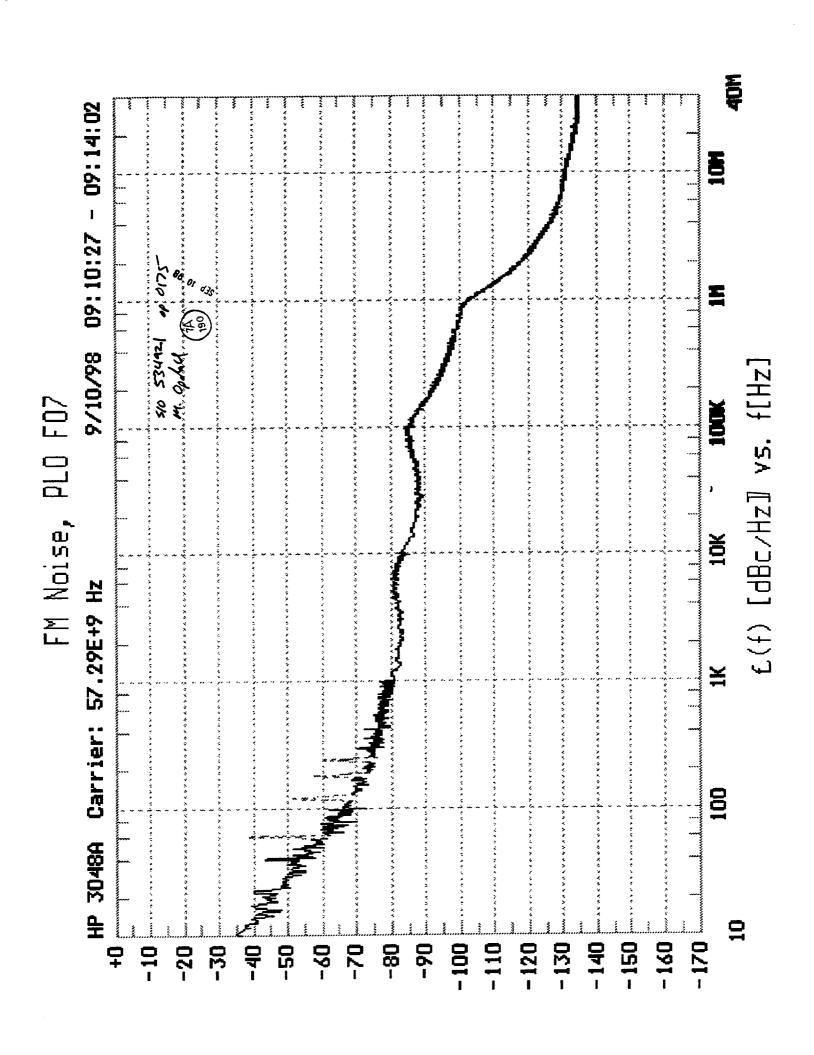


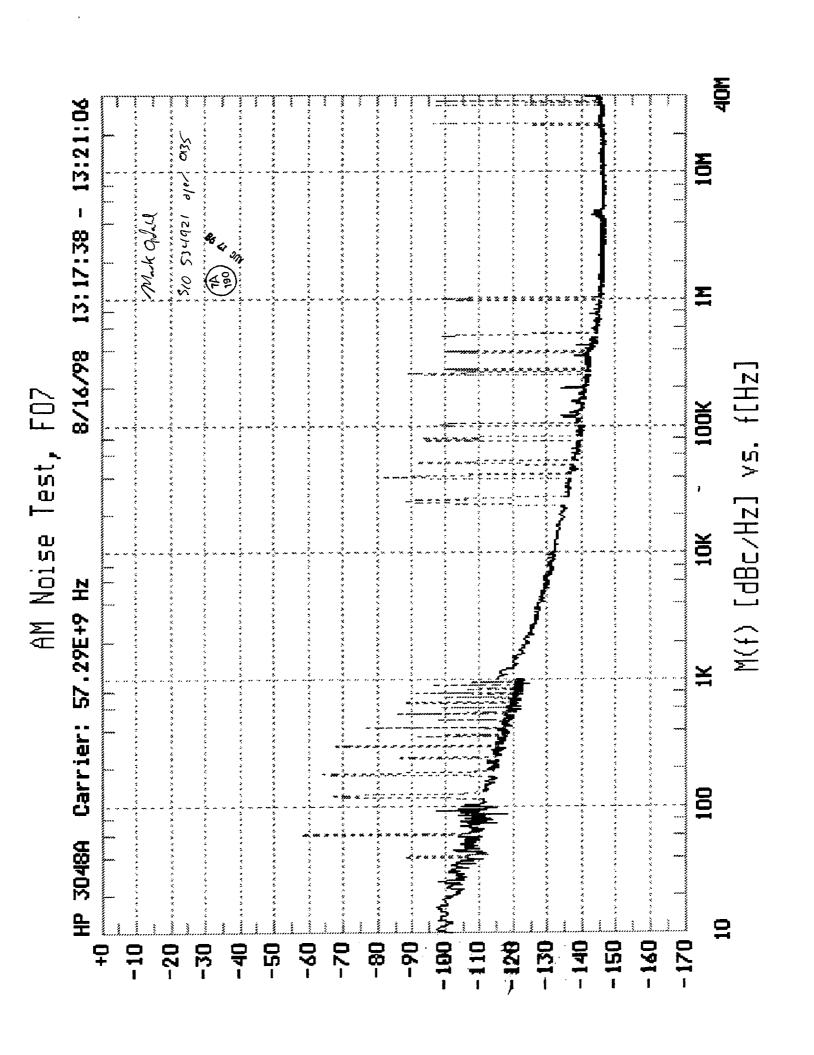
Section 6A: AM/FM Testing - F07

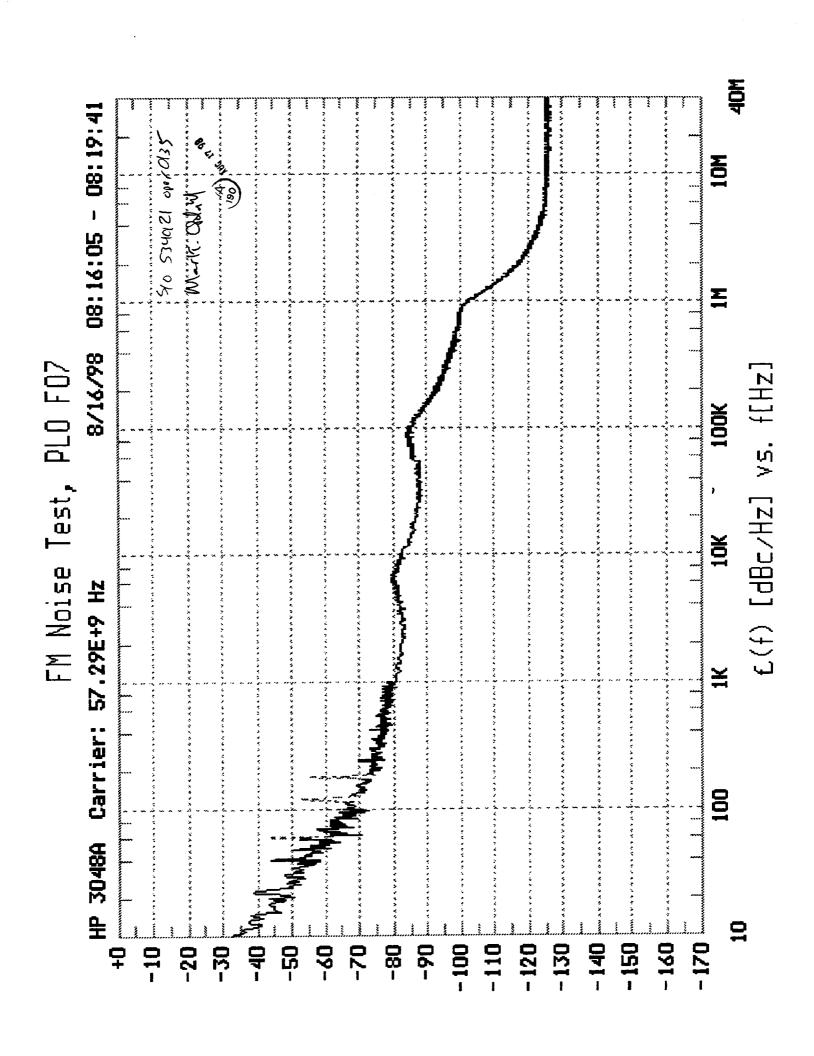
The following section contains the raw data from the AM/FM Noise Tests. Requirements are that the FM Noise level be less than -100 dBc/Hz for frequencies greater than 1 MHz. Requirements are that the AM Noise level be less than 130 dBc/Hz for all frequencies greater than 1 MHz. Both Tests Pass.

		-	





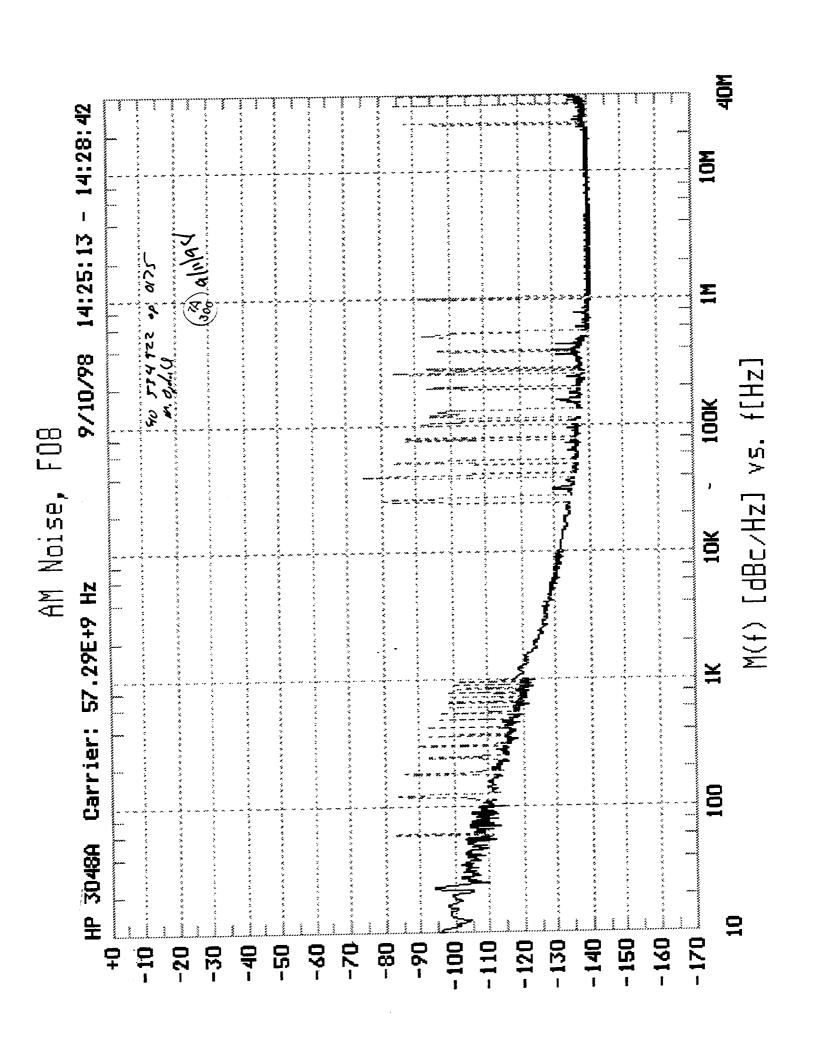


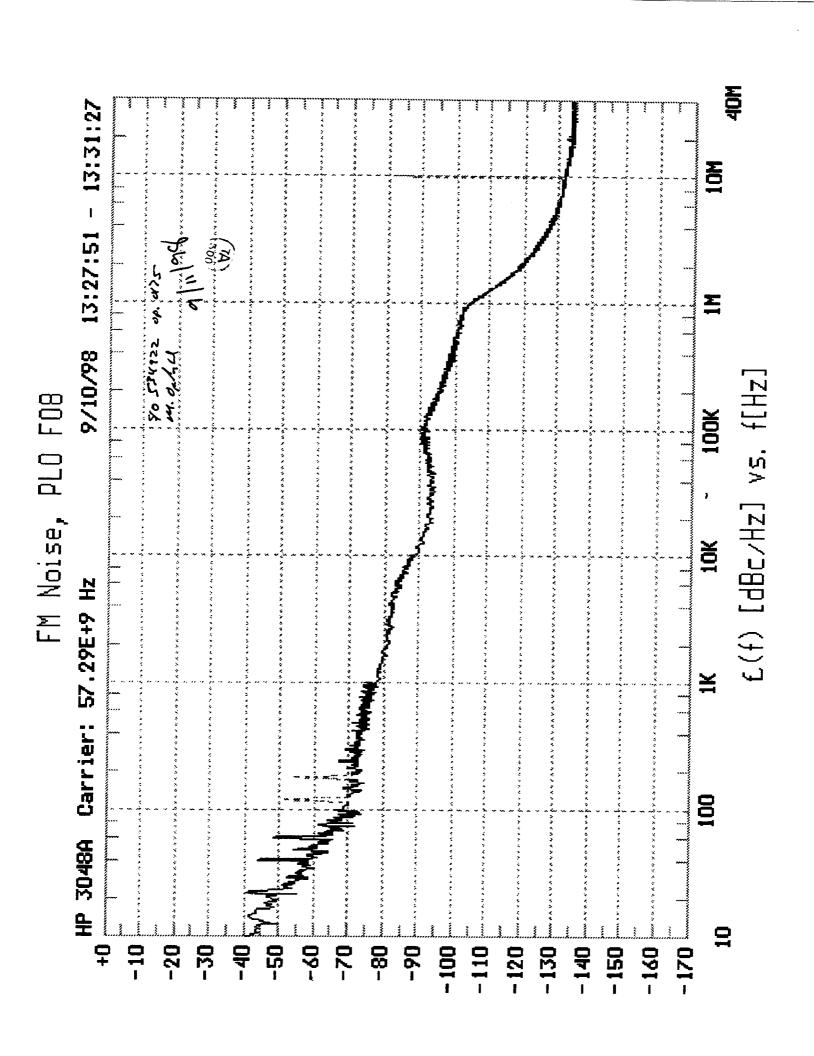


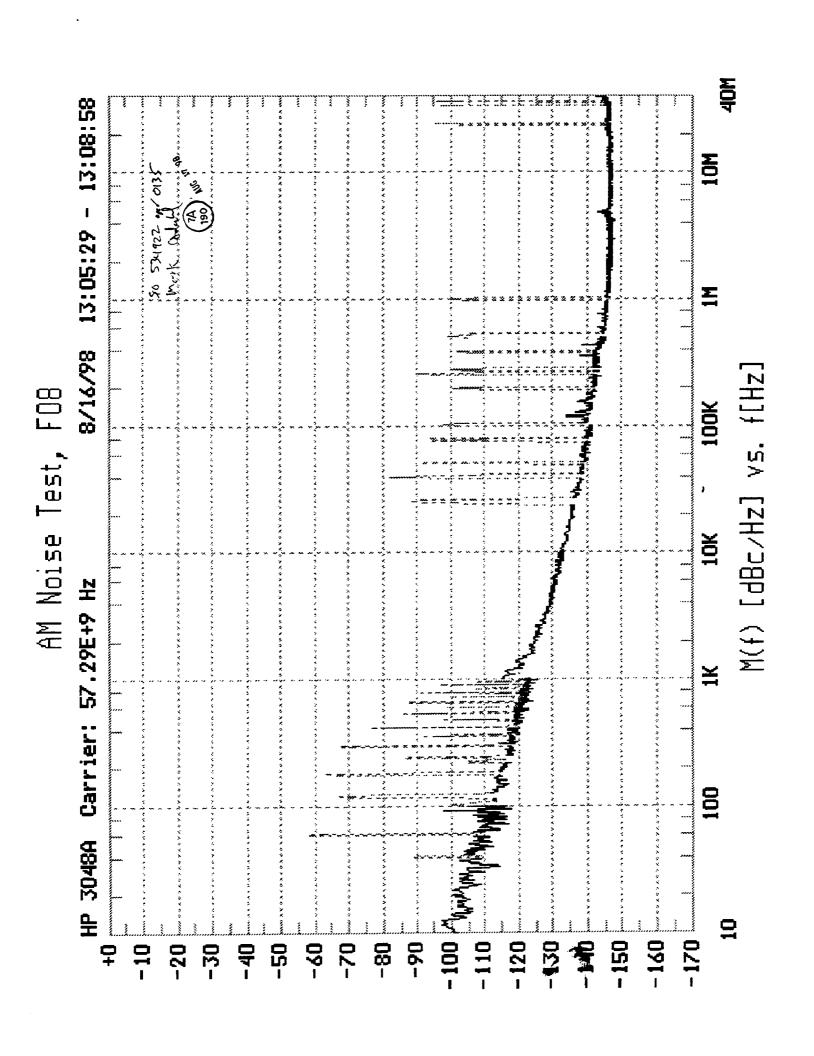
Section 6B: AM/FM - F08

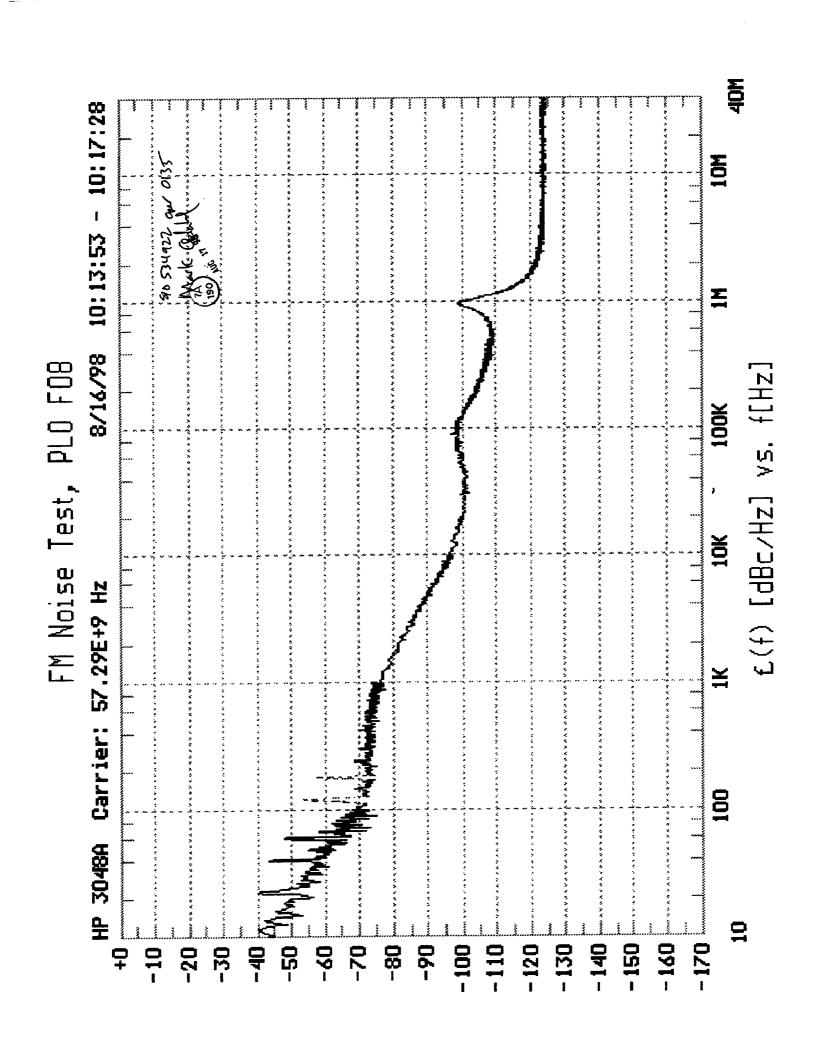
The following section contains the raw data from the AM/FM Noise Tests. Requirements are that the FM Noise level be less than -100 dBc/Hz for frequencies greater than 1 MHz. Requirements are that the AM Noise level be less than 130 dBc/Hz for all frequencies greater than 1 MHz. Both Tests pass.







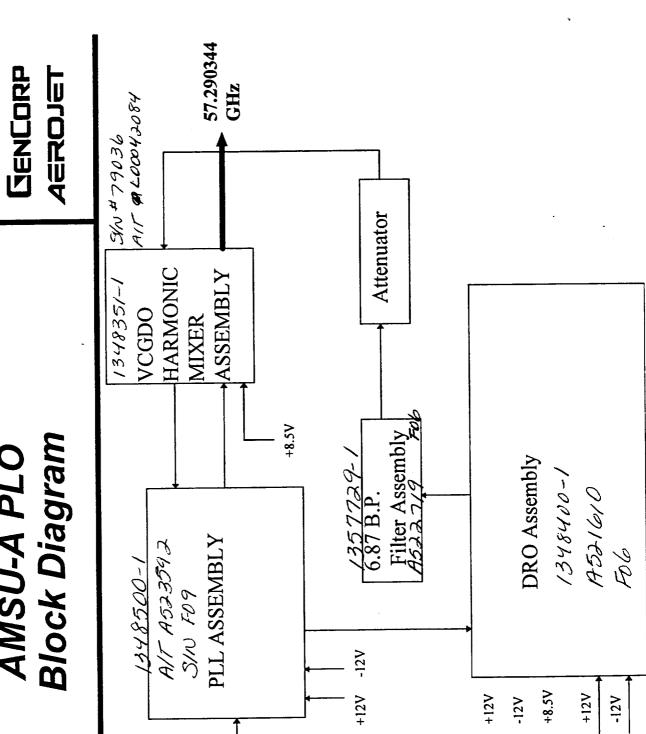


PLO AS BUILT CONFIGURATION

Part Name	Part Number	Serial Number	
		F07	F08
1. TCXO	1348325-1	51477	48690
2. VCGDO	1348351-1	79036	79031
3. PLL Assembly	1348500-1	F09	F08
4. DRO Assembly	1348400-1	F06	F09
5. Voltage Regulator	1357979-1	F11	F06

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AMSU-A PLO



SI AFT ASSA THE

+12V

1000 4/191 TCXO SW 4751-51 143.22586 MHz

348325

1357979-

A 533 784 Voltage Regulator Assembly

-15V

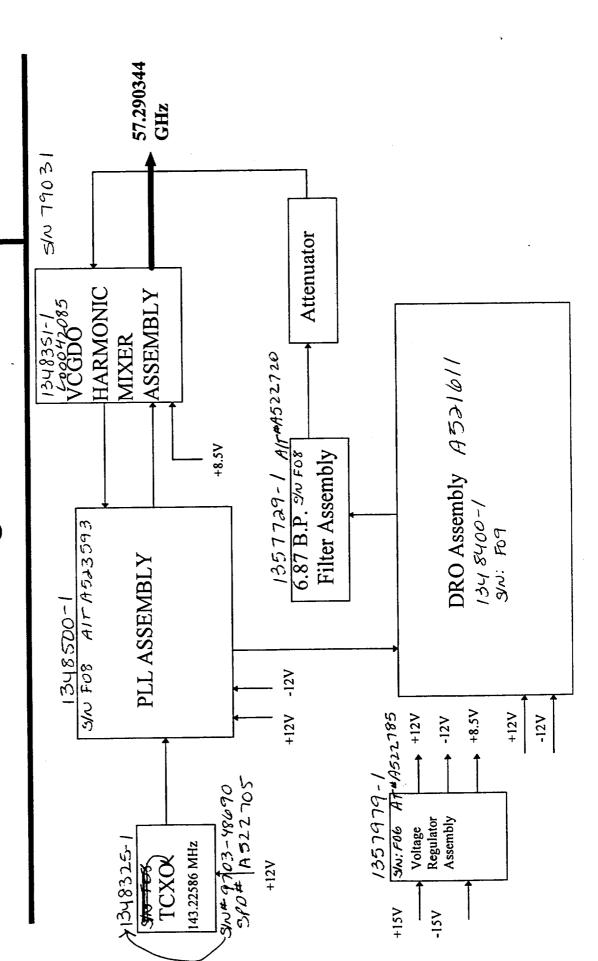
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Block Diagram AMSU-A PLO



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PREPARATION OF THE REPORT DOCUMENTATION PAGE

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- Block 11. Contract or Grant No. Provide when applicable.
- Block 12. <u>Sponsoring Agency Name and Address.</u> National Aeronautics and Space Administration, Washington, D.C. 20546-0001. If contractor report, add NASA installation or HQ program office.
- Block 13. <u>Type of Report and Period Covered</u>. NASA formal report series; for Contractor Report also list type (interim, final) and period covered when applicable.
- Block 14. Sponsoring Agency Code. Leave blank.
- Block 15. Supplementary Notes. Information not included

- elsewhere: affiliation of authors if additional space is required for Block 9, notice of work sponsored by another agency, monitor of contract, information about supplements (file, data tapes, etc.) meeting site and date for presented papers, journal to which an article has been submitted, note of a report made from a thesis, appendix by author other than shown in Block 7.
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